

JAN 20 1938

MEDICAL LIBRARY

# *Archives of* PHYSICAL THERAPY

(Incorporating PHYSICAL THERAPEUTICS)  
with  
INTERNATIONAL ABSTRACT

*Official Journal American Congress of Physical Therapy*



**17th Annual Session**  
AMERICAN CONGRESS OF PHYSICAL THERAPY  
SEPTEMBER 12, 13, 14, 15, 1938  
PALMER HOUSE CHICAGO

Volume XIX

JANUARY, 1938

No. 1

# Compare Lepel



deep heat figures as published by the A. M. A. Council on Physical Therapy, (J. A. M. A. October 23, 1937 issue page 1364) with those published for competitive machines.

Note particularly the difference between skin temperature and deep muscle temperature. Excessive skin heat and the consequent danger of skin burns are effectively avoided by the use of Lepel flexible electrode arms and air-spaced electrodes, as the skin is not touched at all.

## Average Temperatures in Six Observations, Air-spaced Technic

Deep Muscle		Subcutaneous		Skin	
Initial	Final	Initial	Final	Initial	Final
97.1	106.2	93.9	104.8	88.9	95

## Average Temperatures in Two Observations, Coil Technic

97.4	105.0	93.9	103.3	88.1	94.1
------	-------	------	-------	------	------

## Average Pelvic Temperatures in Six Observations

Initial 95.4	Final 106.9
--------------	-------------

Often pelvic temperatures of 108° to 109° are reached within six or seven minutes with direct contact electrodes although the heat feeling at the point of contact is only mild.



Send for a Free Copy of our booklet entitled

## "Short Wave Therapy"

in which you will find simply and concisely explained the nature of Short Waves, the difference between Short Wave and Diathermy

and many other questions pertaining to Short Wave Therapy.

**LEPEL High Frequency Laboratories, Inc., 39 West 60th St., New York**

**BOSTON**  
25 Huntington Ave.

**CHICAGO**  
500 S. Wolcott St.

**BRANCH OFFICES:**  
**PHILADELPHIA**  
1701 Walnut St.

**LOS ANGELES**  
1428 N. Vermont Ave.

**SAN FRANCISCO**  
408-450 Sutter Bldg.

Mail this  
coupon  
today.



**LEPEL High Frequency Laboratories, Inc.**  
39 West 60th Street, New York

APT 1-38

- ☐ Please send me information on your short wave machines.  
☐ Please send me your free booklet on Short Wave Therapy.

Dr. ....

Street..... City.....

# Contents — Jan. 1938

Volume XIX

No. 1

## ARCHIVES OF PHYSICAL THERAPY

DISRAELI KOBAK, M.D., Editor

Suite 712 — 30 North Michigan Avenue, Chicago, Illinois

Original contributions, exchanges and books for review should be forwarded to the Editorial Office. All business matters including advertising should be handled through the Executive Office, Suite 712—30 N. Michigan Ave., Chicago, Illinois. The statements in the manuscripts published in the ARCHIVES OF PHYSICAL THERAPY, are made solely on the responsibility of the author. The American Congress of Physical Therapy does not assume any responsibility for statements contained therein. Manuscripts accepted for publication in ARCHIVES OF PHYSICAL THERAPY, are for exclusive publication and may not be published elsewhere.

### OFFICERS

#### American Congress of Physical Therapy

FREDERICK L. WAHRER, M.D.,  
Marshalltown, Iowa, President.  
FRANK H. KRUSEN, M.D.,  
Rochester, Minn., President-Elect.  
WILLIAM H. SCHMIDT, M.D.,  
Philadelphia, First Vice-President.  
NATHAN H. POLMER, M.D.,  
New Orleans, Second Vice-President.  
FRED B. MOOR, M.D.,  
Los Angeles, Third Vice-President.  
KRISTIAN G. HANSSON, M.D.,  
New York, Fourth Vice-President.  
MILAND E. KNAPP, M.D.,  
Minneapolis, Fifth Vice-President.  
JOHN STANLEY COULTER, M.D.,  
Chicago, Treasurer.  
RICHARD KOVACS, M.D.,  
New York, Secretary.  
MARION G. SMITH, B.S.,  
Chicago, Executive Secretary.  
A. R. HOLLENDER, M.D.,  
Chicago, Managing Director.

### EXECUTIVE COUNCIL

William Bierman, M.D., New York, *Chairman*.  
Norman E. Titus, M.D., New York, *Secretary*.  
John Stanley Coulter, M.D., Chicago.  
James C. Elsom, M.D., Madison, Wisconsin.  
Frank H. Ewerhardt, M.D., St. Louis.  
Roy W. Fouts, M.D., Omaha.  
John Severy Hibben, M.D., Pasadena.  
Disraeli Kobak, M.D., Chicago.  
Gustav Kolischer, M.D., Chicago.  
Albert Frank Tyler, M.D., Omaha.  
Frank H. Walke, M.D., Shreveport, La.  
Frederick L. Wahrer, M.D., Marshalltown, Iowa, *Ex-Officio*.

### PUBLICATION COMMITTEE

DISRAELI KOBAK, M.D.  
A. R. HOLLENDER, M.D.  
ALBERT F. TYLER, M.D.  
M. C. L. MCGUINNESS, M.D.  
RICHARD KOVACS, M.D.  
WM. H. SCHMIDT, M.D.  
FRANK H. KRUSEN, M.D.

Subscriptions — In the United States, its possessions, and Mexico, \$5.00 yearly; Canada, \$5.50; elsewhere, \$6.50 the year.

Advertising rates on application. All advertising copy subject to acceptance by publication committee.

Published monthly at Chicago, Illinois, by American Congress of Physical Therapy. Entered as Second Class Matter June 2, 1930, at the Post Office at Chicago, Illinois, under the Act of March 3, 1879.

### ORIGINAL ARTICLES

- Deformities Following Fracture: Their Prevention and Treatment ..... Melvin S. Henderson, M.D. 7
- Short Wave Treatment of the Endocrine System, Diencephalon and Mesencephalon, Part II..... J. Samuels, M.D. 13
- Relation of Autonomic Nervous System to Physical Therapy..... Albert Kuntz, Ph.D., M.D. 24
- The Elliott Treatment in Prostatic Disorders..... Leander William Riba, M.D., and Cyril Vance, M.D. 29
- Discussed by Drs. G. M. Blech, Rogers Deakin and Leander W. Riba.
- Electrocoagulation in Bronchogenic Conditions..... John D. Kernan, M.D. 38
- Discussed by Drs. M. H. Cottle, H. H. Forbes, Rudolph Kramer, M. J. Mandelbaum, and John D. Kernan.
- Restoration of Muscle Balance in the Treatment of Sciatic Pain ..... R. E. Lenhard, M.D., and H. O. Kendall, M.D. 44

### EDITORIALS

- The Archives of Physical Therapy — A New Title..... 47
- Short Wave Diathermy in Endocrine Disturbances..... 48
- Electrosurgery and Bronchoscopy..... 49

### THE STUDENT'S LIBRARY

- Book Reviews ..... 51

### INTERNATIONAL ABSTRACTS

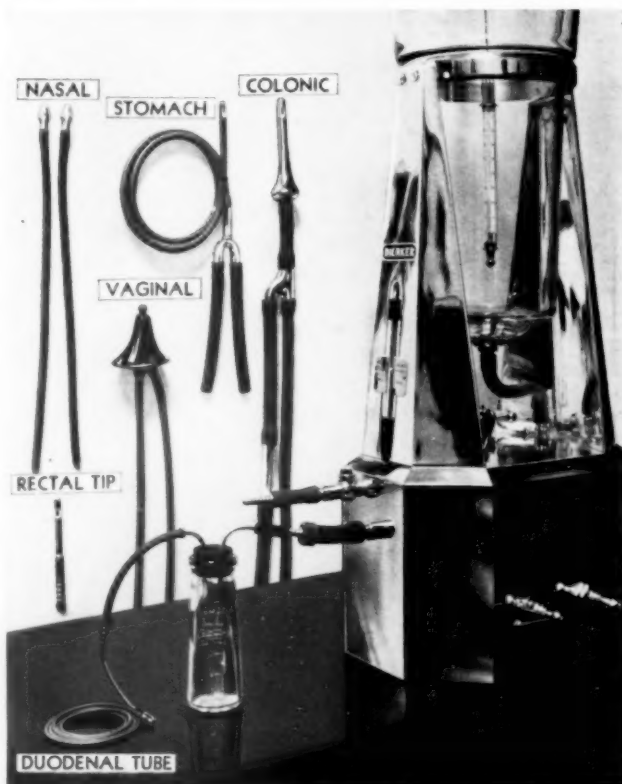
- Abstracts on Physical Therapy, X-Ray, Radium, Biophysics ..... 55

# DIERKER THERAPEUTIC APPARATUS

*For Administering Treatments and Medication to Accessible Cavities*

## USERS and REFERENCES

New York Polyclinic Medical  
School and Hospital  
Battle Creek Sanitarium  
Loma Linda Sanitarium  
Loma Linda, Calif.  
Hollywood Hospital  
Hollywood, Calif.  
Santa Barbara Cottage Hospital  
Santa Barbara, Calif.  
San Rosario Sanitarium  
Cambridge Springs, Penn.  
Los Angeles Gen'l Hospital  
Glendale Sanitarium and Hospital  
Glendale, California  
Florida Sanitarium and Hospital  
Orlando, Florida  
California Lutheran Hospital  
Los Angeles, Calif.  
Santa Monica Hospital  
Santa Monica, Calif.  
Harding Sanitarium  
Worthington, Ohio  
Golden State Hospital  
Los Angeles, Calif.  
Angelus Hospital  
Los Angeles, Calif.  
The California College of Medi-  
cal Technicians  
San Gabriel, Calif.  
Michael Reese Hospital  
Chicago, Illinois  
Queen of Angels Hospital  
Los Angeles, Calif.  
Cedars of Lebanon Hospital  
Los Angeles, Calif.  
New York Post-Graduate Medical  
School and Hospital  
St. Luke Hospital  
Pasadena, Calif.  
Monterey Hospital  
Monterey, California  
White Memorial Hospital  
Los Angeles, Calif.  
Gotham Hospital, New York  
Manhattan General Hospital, N.Y.  
Huntington Memorial Hospital  
Pasadena, Calif.  
Desert Sanatorium  
Tucson, Ariz.  
Morelos Hospital  
Mexico City, Mex.  
Harlem Valley State Hospital  
Windsdale, N. Y.  
Good Samaritan Hospital  
Los Angeles, Calif.  
Dante Hospital  
San Francisco, Calif.

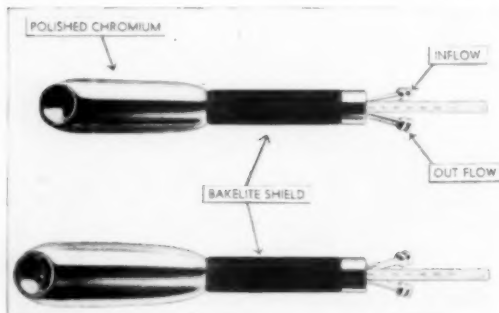


U. S. Patents: No. 2024967, No. D96534, No. 1910756. Pat. in Foreign Countries

Approved by many members of the profession as the method of choice, because with the Dierker Apparatus corrective treatment may be administered, within physiologic limits, and also cleansing treatment and medication may be administered, directly to the stomach, duodenum, naso-pharynx, bladder, vagina, colon and rectum.

## FOR OTHER TREATMENTS

The apparatus may be operated with or without vacuum, or as a continuous in and out flow as needed in a heat treatment to the vagina by means of hot water applicators, as illustrated here.



## INVALUABLE FOR THE PHYSICAL THERAPIST

Useful adjunct for the  
Gastroenterologist  
Internist  
Gynecologist  
Urologist  
Roentgenologist

Preparation for  
X-ray Diagnosis  
Surgery  
Post-operative Elimination

Preparation for Fever  
Treatments



*Ask your local dealer to supply you.*

MANUFACTURERS

# THE DIERKER CO.

Phone DRexel 1224

1903-1905 West 9th Street

Los Angeles, California



## DEFORMITIES FOLLOWING FRACTURE: THEIR PREVENTION AND TREATMENT \*

MELVIN S. HENDERSON, M.D.

Section on Orthopedic Surgery, The Mayo Clinic

ROCHESTER, MINNESOTA

No branch of surgery has an older history than that which has to do with fractures. Ancient archives compiled by the masters of their time contain suggestions and rules concerning the treatment of various fractures. Since printing came into use, book after book dealing with fractures has been published and they still continue to appear. One would think that the last word has been written on the subject, but experience teaches that much will bear repetition.

Every fracture should be looked on as a potential source of permanent disability and deformity. I propose to draw attention to some disabilities and deformities that follow certain of the more common fractures. If these pitfalls that strew the pathway of those who treat fractures are borne in mind the surgeon is forearmed and better able to chart a course that will bring his patient into the haven of good results.

### Wrist Joint

*Colles' Fracture.* — This fracture of the radius usually is the result of a fall on the outstretched and pronated hand. Posterior displacement of the lower fragment is usually present and radial deflection is common. A moderate amount of "silver fork" deformity is compatible with good function, but if the deformity is too great, prolonged painful convalescence is certain to follow and, possibly, permanent restriction of motion of the wrist and fingers. Reduction should be complete and maintained for at least three weeks by molded anterior and posterior plaster splints with the wrist in flexion and ulnar deviation. A sling is essential or the hand will swell, necessitating loosening of the splints, and the correctness of position of the fragments will be endangered. When considerable ecchymosis and extravasation along the tendon sheaths and fascial planes are present, early, active movement of the fingers and wrist must be insisted upon. This movement must be supervised by the surgeon, for the inexperienced person may allow too much active movement and force passive movements too far. Prolonged splintage does much harm but the splints must be worn until the callus has become sufficiently solid to prevent recurrence of the deformity.

Physical therapy, using guided, active movements and carefully conducted passive movements along with gentle massage, warm water baths and perhaps whirlpool baths will do much to hasten recovery. Too much treatment may prolong the soreness and stiffness, and there comes a time when all treatment should cease and the patient should be dismissed to be observed only occasionally.

The residual deformities, with firm, bony malunion present a challenging problem. It must be determined whether osteotomy should be done and the deformity corrected or whether the deformity should be left and time allowed to elapse in the hope that function ultimately will be satisfactory. For younger individuals, generally speaking, osteotomy should be favored. If seen early, before the malunion has become solid, strong manipulation may correct the deformity.

\* Read at the Sixteenth Annual Session of the American Congress of Physical Therapy, Cincinnati, Ohio, September 20, 1937.

### Fractures of the Elbow

*Fractures of the Lower End of the Humerus.*—These fractures are most common among children and sometimes are spoken of as epiphyseal separations although true epiphyseal separations are rare. The fact that the elbow is a hinge joint explains why serious impairment of motion may follow these injuries if the fracture is not immediately and completely reduced (fig. 1). If reduction is not possible by manipulation, open reduction must be resorted to and the fragments must be held by whatever means the surgeon chooses. If the fracture is not reduced, flexion and extension are limited and not infrequently, even if motion is good, the carrying angle may be lost with resulting disability and unsightliness. Following manipulative reduction the position of choice is acute flexion. The taut triceps, lying posteriorly, acts as a sort of splint forcing the posterior lower fragment forward. The open operation, including pegging with beef-bone screws or other means, has the decided advantage that the fragments are held together and the position of acute flexion with its attendant dangers, to be mentioned, is not necessary.

*Volkmann's Ischemia.*—There is always some swelling after a fracture of this kind and it may be so great that the superficial veins of the upper part of the forearm are compressed by impingement of the forearm against the arm. If the flexed position is maintained and the obstruction to venous circulation is not relieved, arterial circulation gradually is shut off and dread ischemia is soon in the saddle. The pain, although severe, is too often ignored, especially if the patient is a child, and unfortunately a few hours are sufficient to ruin the arm. Severe pain and swelling are very definite warnings and demand that the fracture be ignored and that the elbow be immediately dropped from acute flexion. If the radial pulse does not return, the pain cease, cyanosis disappear, the numbness in the fingers lessen, and if the forearm is still tightly swelled, multiple small incisions should be made down through the skin and deep fascia, allowing the blood to ooze out and thus relieve congestion.

*Paralysis Owing to Ischemia.*—Residual deformity of the wrist and hand is typical. The fingers tend to assume the position of claws, the wrist is flexed, the forearm and hand are atrophied, general pallor is present, the soft bellies of the flexors of the forearm may be hard and board-like and varying degrees of sensory disturbance are present (fig. 2). The prognosis depends on the amount of damage done to the muscles. If considerable good muscle fiber is still present, much can be accomplished by physical therapy and by gradual correction of deformities of the fingers and wrist, as outlined by the late Sir Robert Jones. If the degeneration of muscle is extreme, little can be done by these means and it may be necessary to correct the flexion deformity of the wrist either by osteotomy or lengthening the flexor tendons or both (fig. 3). In even more severe cases the patient must use the hand and wrist much as one who has undergone an amputation uses an artificial hand or a hook. If ulceration of the hand and fingers persists, amputation of the hand may be necessary.

Little can be done with malunited fractures. Bony projections anteriorly or posteriorly can be chiseled away, but in my experience the results are usually discouraging. Among children considerable bony deformity may be present and the prognosis may appear poor but youth overcomes many things and the ultimate result may be surprisingly good if nothing is done.

### Fractures and Complications of the Ankle

The common fractures of the ankle are (1) malleolar, (2) bimalleolar and (3) trimalleolar.

*Malleolar Fracture.*—Fracture of the internal malleolus alone is rare whereas fracture of the fibular malleolus is common and leaves no deformity



Fig. 1



Fig. 2



Fig. 3

Fig. 1. — Moulage: position of fragments and danger to blood vessels. Fig. 2. — Moulage: deformity of ischemic paralysis. Fig. 3. — Moulage: result of conservative treatment and lengthening of tendons.

although convalescence may be prolonged beyond the time that would be expected. Occasionally a fracture of the internal malleolus fails to unite.

*Bimalleolar Fracture.* — This fracture must be accurately reduced and held until it is firmly united, else valgoid deformity may follow. After reduction the foot should be held in *varus*, the degree of which varies with the case, and at a right angle in a plaster cast.

*Trimalleolar Fracture.* — Fractures of this type are potentially vicious and unless accurately reduced are certain to cause lasting disability. There is not only lateral displacement but also posterior displacement of the foot (fig. 4a and b), owing to the fact that the posterior malleolus (posterior margin of the tibia) slips backward and with it goes the astragalus and so the whole foot. Lack of recognition of this posterior displacement of the foot is a serious omission. Too often all attention is directed to correction of the valgus deformity and the posterior displacement is neglected.

*Nonunion of the Internal Malleolus.* — This condition does not result in a visible deformity but the ankle is weak, with tenderness and soreness at the site



Fig. 4a. — Trimalleolar fracture of the ankle with posterior displacement of astragalus; b, Trimalleolar fracture reduced with posterior malleolus (or margin) in position.

of fracture. Exposure of the surfaces of the fracture and freshening often will be sufficient but use of an autogenous bone graft of the sliding type will ensure union and is to be favored.

*Valgus Deformity.* — Malunion of the bimalleolar type, with valgus and lateral displacement of the astragalus, is very disabling. Osteotomy of both malleoli and forcing of the astragalus back into position, so that the slightly convex surface of the lower articulating surface of the tibia fits into the slightly concave upper surface of the astragalus, insures correct alignment. The foot must be held in this position for at least eight weeks until the malleoli have united. Weight-bearing for the following four to six weeks should be permitted only with the protection of an outside iron and inside T-strap or the foot again may slip into valgus.

*Valgus Deformity with Posterior Displacement of the Foot.* — This deformity is much more difficult to deal with and, although the valgus element in the deformity can be easily corrected, the posterior displacement is difficult to overcome. A posterior incision, with division of the tendo achillis to facilitate exposure of the posterior malleolus (tibial margin) may be necessary. If reduction of the fragment can be accomplished, some means of holding it, such as a beef-bone screw, must be resorted to. Even then, because the fracture involves the weight-bearing area of the tibia, convalescence is slow and tedious. Arthrodesis is favored by some but a stiff ankle is a disagreeable affair. Nevertheless, in some cases it is necessary, but I have been surprised to find that ultimately, in three or four years, a well functioning ankle was attained in spite of a bad-looking joint as judged by the roentgenogram.

#### Fractures of the Neck of the Femur

*Fresh Fractures.* — No fracture of recent years has received the attention that this fracture has been accorded and distinct progress has been made in its treatment. Smith-Petersen made a real contribution in his triple flanged nail; not because the idea of internal fixation was new, but because when he presented

his method he had a sufficient number of traced patients to prove that better results could be attained than by conservative methods. It has been shown since that exposure of the hip joint is not necessary but that the device for internal fixation can be accurately inserted at the proper angle by aid of specially designed instruments, or a cannulate nail or screw can be inserted over a guide wire, the position of which is verified by anteroposterior and lateral roentgenograms. The patients are likely to be elderly and to constitute poor risks. It has been shown that nothing is to be gained by inserting the device for fixation at once, and if insertion is made a week or two later the period of high mortality is avoided. Although internal fixation with a metal nail or screw is very successful in treatment of recent fractures, there is not enough evidence as yet to show that it is suitable for use in ununited fractures.

*Lag Screw Fixation.*—Because the Smith-Petersen nail does not draw the femoral head and neck together and because the nail occasionally loosens and backs out, at the clinic we have been using a lag screw. Carpenters and joiners long have used this type of screw in their work and the same principle has been advocated by others in treating fractures of the femoral neck. Our lag screw consists of two parts, the lag screw itself (fig. 5) and the telescoping sleeve nut

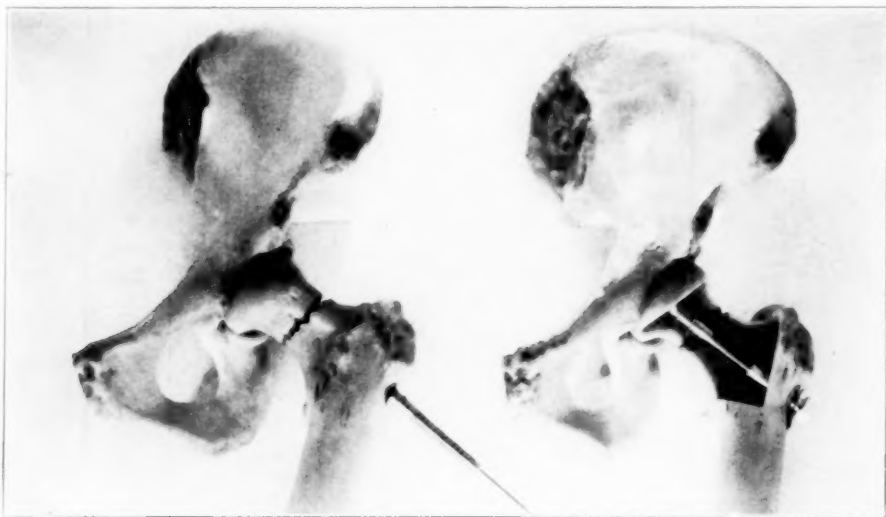


Fig. 5. — Moulage: lag screw being inserted over wire and model cut away to show assembled lag screw.

which is screwed down on the distal end of the lag screw, over a washer which fits snugly against the trochanter. We have tried various metals but most cause a sterile, purulent exudate to form. We are now using duralumin and it has given us no trouble. The duralumin lag screw should be removed in less than six months for it undergoes erosion early. Those who are studying the electrolytic reaction of metals in tissues say that with duralumin this reaction is distinct and that the metal should give trouble in the tissues. In actual practice it has not. Perhaps its lightness and the consequent reduction in the action of gravity are more important than we realize. Internal fixation makes unnecessary the wearing of a cast and permits of early mobility of the knee and hip, thus definitely shortening convalescence. The stiff knee and hip which follow the three months of immobilization in a cast are very trying and painful.

*Fibrous Union of the Neck of the Femur.*—Fibrous union may give fairly satisfactory function but usually it is too weak to stand the strain of weight-bearing and is accompanied by weakness, pain and persistent soreness.

*Fibular Autogenous Bone Graft.*—The autogenous bone graft still stands preëminent in dealing with nonunion and two methods of using the fibula as a graft are worthy of mention. If there is no displacement and the fractured surfaces are in good alignment, a guide wire can be inserted through the trochanter and femoral neck, and well into the head, and over this wire graduated cannulate reamers can be threaded until a channel, large enough to receive the fibula, has been reamed out. A segment of the fibula is then removed from the middle third of the leg, thoroughly cleansed of all muscle and fibrous tissue, roughened slightly with a chisel to permit of ready penetration of its substance by blood vessels and driven in over the guide wire (fig. 6). The average length



Fig. 6.—Moulages: *left*, fracture lined up; *middle*, fibula inserted on wire; *right*, model cut to show fibula in position for ununited fracture.

of the portion of the fibula used is about 8 or 9 cm. Roentgenograms taken at the operating table inform the surgeon whether or not the graft is deeply enough placed in the head. If there is any doubt as to the viability of the femoral head, and as to the condition of the neck of the femur, the hip joint should be opened, the femoral head examined and the neck inspected. If the head is viable and the remnant of the neck sufficient, the fragments can be thoroughly freshened and fitted together and a segment of fibula can be placed as a peg, more or less under visual control.

If the femoral head is viable but the neck is eroded and destroyed, the Brackett operation can be performed. In this operation the trochanter with its muscles is lifted upward, the head exposed and freshened and the upper end of the femur remodeled to fit against it. Apposition of the two is maintained by abduction of the leg and fastening of the trochanter at a considerably lower level on the shaft of the femur. A cast must be worn for ten to twelve weeks. If the head is definitely necrotic or is bound by adhesions to the acetabulum, so that little motion is present, either the Whitman reconstruction operation or the Colonna reconstruction operation is advisable. The basic principle of these operations is to provide skeletal support. The femoral head is excised and the remodeled upper end of the femur is thrust into the acetabulum and bony support thus is provided. As a rule, the most to be expected is walking by aid of a cane or crutch, whereas in the Brackett procedure, the head having been saved, weight-bearing is on natural surfaces and artificial support is rarely necessary in walking.



# SHORT WAVE TREATMENT OF THE ENDOCRINE SYSTEM, DIENCEPHALON AND MESENCEPHALON

J. SAMUELS, M.D.

AMSTERDAM, HOLLAND

## II

### Organotherapy and Short Waves

The question now arises which role is played by organotherapy and which by short wave diathermy in our treatment? We must appreciate that with short waves we obtain daily slight but lasting intracellular improvement of the dysfunctioning gland, thereby gradually regulating the entire system, something that is rarely the case with exogenous products, which even then shows only temporary success. With exogenous products we attain mainly rapid growth and development of the genital tract. It has been established that this alone is insufficient to stimulate the endocrine system, as is shown by the failures of Clauberg, Neumann, Kaufmann, Kehler, v.d. Berg, and others.

The described methodic short wave therapy by which a hormonal equilibrium is attained endogenously, has been proved to be an excellent method for the stimulation of the endocrine system. For the first time success was had in a patient suffering from primary amenorrhea with these newer agents and their application from new points of view. In the treatment of secondary amenorrhea employment of organic preparations is not necessary provided the genital tract is well developed. We group among the more serious types of secondary amenorrhea those cases which have lasted more than six months. If the etiology happens to be an infectious or some other disease, this naturally has to be treated as the main cause.

In the serious types of secondary amenorrhea it does not always appear easy to remove the disturbances. Let us for illustration glance at the scheme which Clauberg has published in Stöckel's handbook:

TABLE 1. — *Results of Treatment of Amenorrhea (Clauberg)*

	Number	Cured	Improved	Unchanged
Primary Amenorrhea .....	2	—	—	2
Secondary Amenorrhea .....	16	4	1	11

Neither of the two patients with primary amenorrhea was cured. Of 16 cases of secondary amenorrhea 11 remained uninfluenced, 4 were cured and one improved. No mention is made of the four cases how long they have lasted, so that it is possible that they belonged to the mild type of secondary amenorrhea. If we regard the total of 18 cases of amenorrhea it is seen that 13 remained entirely uninfluenced, one was improved and 4 patients were cured. From this statistical report it is clear that the hormonal method, which in the past was the only one used, leaves much to be desired in the matter of results. In cases of oligo- and hypomenorrhea, too, the results are not brilliant. Of 22 cases only 2 were cured and 5 improved, 15 remaining uninfluenced. I would urge to treat all serious cases of amenorrhea and oligomenorrhea with the described organo-short wave method.

According to the investigations of Jellinek, v. Oettingen, Roffo and others we can accept that in contrast to x-ray treatment the ovaries are not harmed by short wave therapy and progeny is not endangered. We can ob-

serve that when beans are subjected to daily small dose radiation in the condenser field, the plants developed from them are stronger, more beautiful and larger than untreated beans of the same plant (v. Oettingen). The same observation was made by Jellinek with parrot eggs and also in young animals which were daily subjected to radiations of small dosage. In contrast to the non-irradiated animals of the same litter they became stronger and larger.

It cannot be emphasized too strongly that the main thing is not to employ too large doses. Endocrine disturbances are cured only by small and moderate ones, so that the hypophysis is given 40, the thyroid about 50 to 100, and the other glands 150 to 200 watts. In individuals with large bodies I give up to 250 watts and in exceptional cases even more, but even in these patients I do not overstep the 300 watt limit.

### Report of Unusual Case

The second case shown in fig. 7 is so to speak the opposite of the first one, and no less interesting. The diagnosis was hyperpituitarism and hyperfolliculinemia and consequent cystoglandular hyperplasia of the endometrium. In none of the larger gynecologic text-books is a similar case described. The diagram taken in connection with the symptoms cleared up the case and led to a cure. The patient, an unmarried woman aged 38, had been sick for 10 years, suffered from violent attacks of headache with symptoms of the diencephalon, nystagmus, cerebellar ataxia (crura cerebelli), vomiting, slight elevation of temperature and disturbances of the acusticus, olfactorius and opticus tracts. The attacks were so intense that the patient was forced to remain in bed about 12 days of every month. For this reason she was treated neurologically, two trephinings of the cerebellar region having proved fruitless. Finally the patient consulted me because she was of opinion that her disease had a relation to her profuse menstrual flow for which she desired castration by roentgen rays. A diagram was made which revealed a hypophyseal-ovarian hyperfunction (fig. 7).

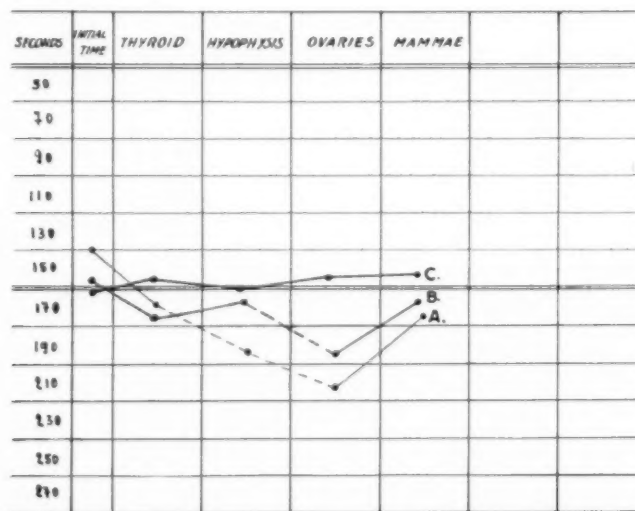


Fig. 7. — Hyperpituitarism and hyperfolliculinemia (cystoglandular hyperplasia of the endometrium). A = diagram of Jan. 23, 1937 — dysfunction of hypophysis and ovaries (hyperfunction). B = diagram of Feb. 22, 1937. C = diagram of March 15, 1937, all glands in equilibrium, attacks and complaints disappeared.

By short wave therapy in the sense of first inhibiting the hypophysis by radiations of the thyroid gland, followed by direct radiations of the hypophysis and diencephalon the attacks completely disappeared for the first time in ten years. As is seen in the diagram, the system attained equilibrium. The attacks in the second preovulation apex and in the premenstrual phase of the cycle, which was in relation

to a high hormonal state, no longer appear, and through it the menorrhagia caused by the cystoglandular hyperplasia ceased. Mention is made here that menorrhagia not due to tumors becomes arrested after radiations of the hypophysis through excitation of the posterior lobe and increased formation of pituitrin.

Hypofunction of the ovaries has been described with precision, as has been in some respects hyperfunction, i.e. the cystoglandular hyperplasia of the endometrium which results in this condition. Neumann, of Marburg, has published his opinion that the cause of cystoglandular hyperplasia is an excessive outpouring of the follicular hormone. The disturbances of the hypophysis, of the di- and mesencephalon are less known as the main cause or accompaniment of cystoglandular hyperplasia.

Spectroscopic investigation revealed that there was not only a hyperfunction of the ovaries but also one of the hypophysis, which affected the neighboring parts of the brain by increased hormonal production by way of the blood channel. The endocrine electrodiagram, the development of the symptoms and the therapeutic results prove a relation between the simultaneous dysfunctional deviation of the surrounding diencephalon and mesencephalon and the hyperfunction of the hypophysis and ovaries. At the same time the above described centers and tracts may be drawn in and dominate the pathologic picture, while through the prolonged effect of the hyperfolliculinemia there develops a cystoglandular hyperplasia of the uterus.

For an understanding of the success of our short wave treatment it is necessary to give a brief description of the case. The patient had some time ago suffered from attacks of headache and nausea. About seven years ago she underwent a nephrotomy on a probable diagnosis of nephrolithiasis. At this operation the wound in the kidney must have bled so violently that the surgeon was compelled to extirpate the left kidney. After this operation the disturbances were strikingly aggravated and at the same time there appeared the other described symptoms of the mid- and inter-brain. These disturbances became so annoying that the family physician referred the patient to a neurologist. Probably on account of the cerebellar ataxia a diagnosis of disease of the cerebellum was made, for in 1932, the patient underwent trephining in the cerebellar region. She reports that the diagnosis then made was chronic arachnoiditis. The disturbances continued after the operation. Afterward puncture of the corpus callosum was made three times. A year later another surgeon who thought that the first operation was not adequate trephined a second time. As the patient relates the arachnoid was radically removed from the operated region of the cerebellum. The pronounced symptoms at that time were intense headaches, nystagmus, vertigo, cerebellar ataxia vomiting, slight elevation of temperature and symptoms of the opticus and acusticus tracts. The attacks continued also after the second intervention.

Early in 1935, pains appeared in the back and the right shoulder. In December of the same year there appeared icterus, and at the beginning of 1936, a surgeon deemed it necessary to operate on the gall bladder because he suspected gall stones. On operation no stones were found. The patient was given a rest cure and diet, which resulted in disappearance of the jaundice. The above described complaints, however, remained unchanged.

Early in 1937, the patient consulted me and definitely stated that the disturbances were worse about nine days before the appearance of the menses, and kept up to about four days before the menstruation, when they abated. With the appearance of the menstrual flow the complaints ceased. About 14 to 15 days after the preceding menstruation, therefore between the two monthly periods (ovulation), she experienced the same attacks for 3 or 4 days. These ovulation attacks were not as violent as the premenstrual disturbances. During the days of her headaches with the described accompanying symptoms she was unable to rise from her bed. The physicians who had treated her had rejected a relation with the menstruation.

As can be seen from the diagram the initial figure was 125, the thyroid irritation figure 160, the hypophysis 180 and the ovary 200. A few days later increased excitation of the thyroid carried out with about 100 watts reduced the hypophyseal and ovarian figures to 170 and 180 respectively, which fully established the hyperfunction of these two glands. A cyclogram was prepared which showed that the intermenstrual attack coincided with the rise of the curve after the first ovulation, that is, at the preparation for the second ovulation, where the state of cycle remained high even during treatment (fig. 8). This cyclogram makes it plain why these attacks were most intense nine days before menstruation. One also sees that during the time of treatment when the figures were already lower, this period of the cycle manifests a high

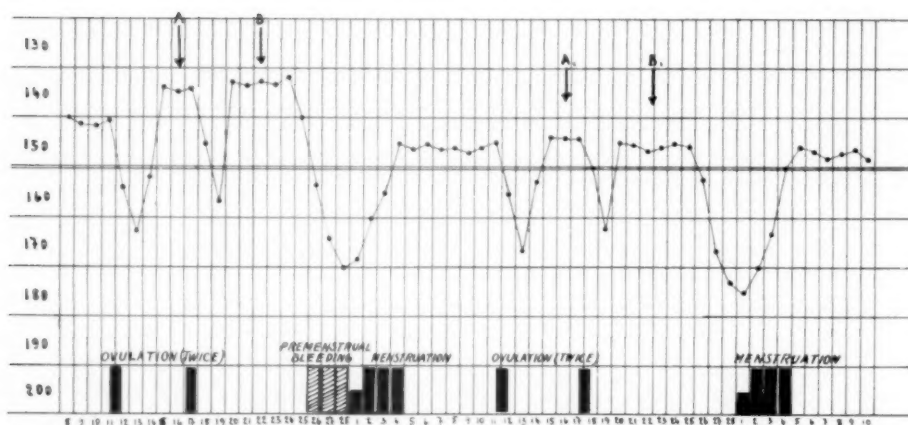


Fig. 8. — Cyclogram of patient with hyperpituitarism (see fig. 7). A = high cycle state between 1st and 2nd ovulation; B = premenstrual high state; note difference in the curve before (A, B.) and after treatment (A<sub>1</sub>, B<sub>1</sub>).

curve in accord with the hormonal level. After five days, in the premenstrual stage, the curve gradually declined. At this same time appear the premenstrual hemorrhages. At the beginning of the menstruation the complaints ceased entirely, and the curve of the cyclogram is lowest. With the therapy it became possible to force down the curve, which at first was very high. The cyclogram shows all these processes and visualizes the therapeutic results. It presents another means of control alongside the endocrinic electrodiagram.

We can follow by the cyclogram the rise and fall of the hormonal level and at the same time the accompanying phenomena of the diencephalon. And now that we have this knowledge, the peculiar disease becomes understandable to us. The make-up of the case is probably the following. The patient who is unmarried had from the very first an increased hypophyseal and ovarian function. After the left kidney was extirpated the disturbances increased. Folliculin and other hormones are partly eliminated with the urine. It is probable that one kidney proved inadequate for this work, so that the already increased quantities of folliculin in the body became larger, which in turn raised the hormonal level and thereby aggravated the complaints of the patient. The jaundice probably had the same cause and developed through insufficiency of the liver produced by greater reduction of the folliculin in the liver. If one gives a woman an injection of 50,000 mouse units of menofornon one will find, as was shown by Siebke and others, that within twenty-four hours 5,000 units are eliminated with the urine and a like quantity with the feces. The remainder has disappeared without a trace and is broken up in the liver. Increased breaking up of large hormonal quantities in the liver may damage the liver cells, which may result in a disturbance of the main excretion, namely of bile, which is emptied in the blood channels instead of the biliary capillaries.

The existing cerebellar ataxia caused the neurologist to think of a cerebellar disease. Both cerebellar operations, however, had no lasting success. The endocrine electrodiagram rendered possible the correct diagnosis and showed the way to the therapy. Radiations of the thyroid are the most energetic means we know for the inhibition of a hyperfunctioning hypophysis. At the same time it should be considered that while radiations of the thyroid inhibit the hypophysis, radiations of the hypophysis complement the thyroid function, because through it results an increased production of thyreotropic hormones. The same thing is seen in most peripheral glands — radiations of these glands inhibit the hypophysis, while radiations of the hypophysis exert a complementary effect on the peripheral glands.

It is also of interest that our patient with a high hormonal level tolerated large doses of thyroid. At a low hormonal level the same doses gave her headache, from which it is evident how minutely cells and tissues react by dysfunction to an overdose of folliculin or thyroid substance. Exogenous thyroid doses at first exert the same inhibitory influence on the hypophysis, but have the disadvantage that the thyroid gland is put into a certain state of inactivity with gradually lessened production. As soon as we stop the administration of thyroid the relation between hypophysis and thyroid is such as to bring about a relative hyperpituitarism. The complaints then do not disappear, but recur. Radiations of the thyroid have an entirely different effect in that they stimulate the thyroid gland to greater activity while at the same time inhibiting the hyperfunctioning hypophysis. Thus is created an equalization which leads to a lasting cure. Because of the altered hormonal relations and also because the radiations of the midbrain exert a direct regulating influence on the tracts and centers the symptoms of the diencephalon abate. For this reason the present case is extraordinarily instructive.

I do not doubt that the disease now being known will be quite often encountered as an accompaniment or rather as a main cause of cystoglandular hyperplasia, irrespective whether all, several or only one of the tracts or centers is drawn in.

Figure 7 shows how after treatment of four weeks the hypophysis figure mounted from 180 to 155. During this time the hypophysis was at first inhibited by radiations of the thyroid and then treated directly. Next the hypophysis and the ovaries were alternately radiated, the latter, however, only when the folliculin state was low. It was noted that the patient complained of headache if the ovaries were treated while they had a high hormonal state.

The diagram made on March 15 (two months after the first consultation), shows the result of therapy — an endocrine system in equilibrium. During the succeeding fourteen days the patient was given thyroid, hypophyseal and systemic short wave radiations, while the ovaries and uterus were treated only when the cyclogram showed a low hormonal state. In addition eight days before the anticipated menstruation the patient was given for five to six days 5 cat units of luteohormone (progestin), by which the regeneration of the cystoglandular hyperplasia was accelerated and thereby the menstruation regulated.

During the last month with the patient at a low hormonal level, that is during and immediately after menstruation, no treatment of any kind was given, thyroid radiations being administered only nine days before the anticipated menstruation and between the first and second ovulation. Luteohormone was not prescribed. In this kind of endocrine disturbances, too, it is advisable to follow up treatments with intermissions for two or three months after the endocrine system has been regulated and all symptoms have disappeared, the same as was the case with the patient with primary amenorrhea and other endocrine disturbances.

The nervous elements of the midbrain regenerated because they no longer were under the influence of the hyperproduction of the hypophysis and also were subjected to the direct influence of short wave radiation. This caused the disappearance of the morbid phenomena of the di- and mesencephalon. The last menstruation of the patient lasted only four days, and the flow was essentially less than before. Accordingly the abnormality of the endometrium was cured solely by the organo-short wave therapy and without curettage. After the ovulation as well as the menstruation, the



attacks ceased and the patient was enabled for the first time in ten years to do all kinds of work.

### Hyperpituitarism and Peptic Ulcer

In all forms of hyperpituitarism the method of treatment is the same—the hyperfunction of the hypophysis is first inhibited by radiations of the thyroid, thereby indirectly suppressing the hyperpituitarism. This is followed by direct radiations of the hypophysis and of the surrounding diencephalon. By proper recognition of the condition we are enabled to submit to those who are not familiar with the underlying idea results which border on the miraculous. Thus to many it will appear inconceivable that an individual who has suffered for years from a serious disturbance of the stomach is cured by radiations of the normal thyroid and periodic radiations of the hypophysis. But this becomes understandable to every one who has an opportunity to become convinced by the favorable results and appreciates the reason for such a procedure. The following case serves as an illustration.

A woman, aged 41, unmarried, suffered for the past 15 years from a disease of the stomach which manifested itself in attacks of intense pain especially after ingestion of food. A roentgenogram is said to have established that she suffered from a peptic ulcer, for which reason a posterior gastroenterostomy was performed in 1920. After the operation the pains appeared to have somewhat abated, but this lasted only a short time. The patient was later repeatedly given dietetic and other treatments without causing the complaints to disappear. It happened that she recovered a little for a short period, after which she again suffered for weeks and months. A roentgenogram shown me by a radiologist was interpreted by him to indicate the presence of a new gastric ulcer at the juncture of the stomach with the jejunum. I was not convinced by the picture. The patient lost weight and as the pains and complaints increased she was advised by two surgeons whom she consulted to undergo a resection of the stomach.

The patient consulted me for an existing retroflexion of the uterus on which occasion she discussed her anticipated gastric resection. An endocrine electrodiagram was taken which revealed a fairly pronounced hypophyseal-ovarian hyperfunction. The patient stated that her strongest complaints appeared a few days before menstruation and ceased with the beginning of the flow. The menses were fairly abundant and most often lasted 6 to 7 days. In addition some hysterical stigmata were established. We made the diagnosis: hyperpituitarism with hyperfolliculinemia, a slight degree of cystoglandular hyperplasia and involvement of the vegetative tracts of the stomach which caused disturbance of the gastric chemism especially when there was a high hormonal level.

The patient refused a functional examination of the stomach. In place of  $1\frac{1}{2}$  liter milk which she drank hourly every day she was directed to take ordinary food and follow this with pepsin and hydrochloric acid if she should have distress. Apart from this we immediately radiated the thyroid which later was alternated with direct treatment of the head.

Accordingly she was treated identically the same as the preceding case of hyperpituitarism, except that there was no need for luteohormone. After a course of two months all complaints had completely disappeared. She consumes everything, including spices, wine and even foods that are not easily digested without the least gastric distress and without having to take pepsin or hydrochloric acid. It is evident that owing to the possibility of exactly examining the endocrine system and of correctly interpreting the symptoms, the patient was saved from a life-endangering operation.

### Significance of the Cyclogram

Of interest is the history of a girl 19 years of age who consulted me because she was afraid she was pregnant. The menstrual period should have appeared three weeks ago. She stated that previously she had menstruated irregularly, but having had her first coitus she wanted to make sure. After a gynecologic examination the diagnosis "pregnancy" appeared improbable. At that time the significance of the cycle and pregnancy curve was not known. Friedmann's reaction was carried out and was proved negative in two rabbits. It was striking that the patient was very



hirsute on the entire body and also in the face. The facial hirsutity she removed regularly with depilatories. The patient appeared to be slightly imbecile and the face looked pasty. The diagram revealed dysfunction of the hypophysis, ovaries and adrenals. She suffered from hypopituitarism, hypofolliculinemia in connection with secondary amenorrhea and hirsutism. The patient was completely cured with the short wave-organotherapy. Her diagram showed the deviation and the attained equilibrium of the endocrine system. She was given injections of menoformon and hypophyseal and general radiations. Later the adrenals and the ovaries were treated in the condenser field.

Figure 9 is that of a 22 year woman weighing 186 pounds. She has been married for a year. When she came for treatment her menses had

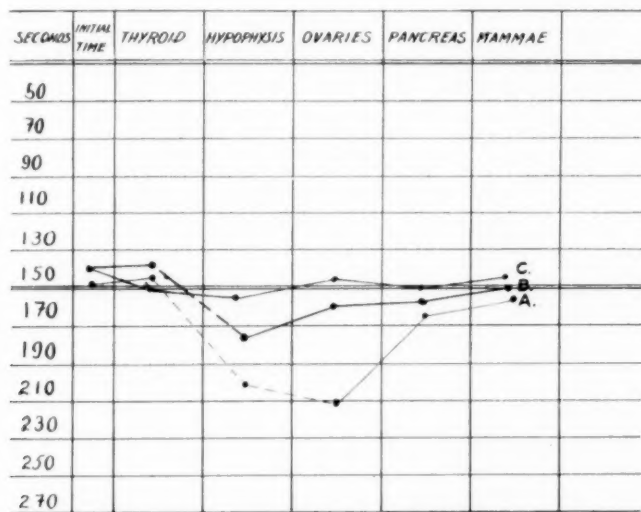


Fig. 9. — Hypophyseal obesity and secondary amenorrhea. A = diagram of Dec. 17, 1936. Dysfunction of hypophysis and ovaries (hypofunction). Patient weighs 186 pounds; thyroid, pancreas and mammae in equilibrium; B = diagram of Jan. 30, 1937. Ovaries greatly and hypophysis less improved; C = diagram of March 12, 1937, endocrine system in equilibrium, menstruation regular, weight 163 pounds.

not appeared for five months. Gynecologic examination revealed a slight hypoplasia of the uterus, whose cavity measured  $5\frac{1}{2}$  cm., and other signs of hypogenitalism. The father of the patient suffers from diabetes and obesity. He weighs 290 pounds. He is said to have suffered from acquired syphilis before the birth of his daughter. The patient had attacks of tachycardia, the pulse often rising to 190, as I had once an occasion to verify, in addition to which she suffered from cerebellar ataxia. The diagram showed hypophyseal and ovarian dysfunction. The diagnosis was: hypophyseal adiposity and secondary amenorrhea with accompanying phenomena of the diencephalon, i.e. disturbances of the vegetative cardiac tracts and of the crura cerebelli. The patient was given menoformon and lipolysin injections, and hypophyseal, general and ovarian radiations. As is shown in diagram 9, she was cured by this therapy. Her weight now is 163 pounds. There are no more attacks, and she menstruates regularly.

The short wave therapy of the endocrine system has been developed on a correct interpretation of the following processes. The bodily cells and therefore the examined part of tissues are very sensitive to changes in the hormonal composition of the blood. Intracellular metabolism suffers from a

too much as from a too little of one or several main hormones. One does not measure with the initial figure the influence of a definite hormone, but that of all hormones of the body cells. If there is a slight hormonal disturbance, the complementary and antagonistic glands attempt to regulate the dysfunction. If the deviation increases the hormonal equilibrium is disturbed, which is noticeable in the altered cellular function and thereby in the initial figure. The endocrine analysis is based on the increase of the dysfunction through excitation, which afterward is expressed in the reduction figure. It would be simpler for the diagnosis if with an excess of one or several hormones the reduction number would be increased, and diminished when there is a lack. But this is not the case. With different hormones the consumers react to an excess as to a lack of the same hormonal kind with a prolonged, respectively shortened period of reduction. In other hormones, for example thyroïdin, the reduction figure is higher than normal when there is an increase, and lower when there is a diminution. For this reason we are able to demonstrate with the electrodiagram only one dysfunction, and later to determine by the symptoms or by the method above described whether there is a hypo- or a hyperfunction. In this respect a body cell must be regarded as an independent organ which is surrounded by a liquid flow in which are found numerous substances and combinations, such as metals, metalloids, albumin bodies, amino combinations, lipoids, hormones, hormon-like substances, and the like. Each kind of cells, nay in all probability each cell is nourished differently, has reserve substances and specific substances which it secretes, and takes from the numerous combinations flowing around it what it needs for its existence. The number of this combination is very large. According to the investigations by Abderhalden and Bomskow it amounts to about 180, so that the figure of the possibility of combinations can be so written. The hormones play the role of activators and regulators.

Dysfunctions of the endocrine producers are slight intracellular deviations, which probably are anatomico-pathologically not discernible or scarcely visible with our microscopes. If these intracellular processes are increased, regeneration may result. In the stage of dysfunction degeneration is still possible with the short wave therapy. If the process progresses there will result pronounced degeneration and even necrosis and cellular death. By the specific electrical effect one succeeds in producing intracellular reactions in the producers as well as the consumers, by which the whole system is regulated. We have the means of investigating these vital processes in living tissue with the aid of the cycloscope and to follow up and control the therapeutic results.

In the evaluation of the intracellular processes one must consider that the cells of the producers are also consumers, and that the production of the diverse incretions suffers when the hormonal composition in and around these cells is not in order. This explains for example why in diabetes and other endocrine disturbances in man there is sexual impotence and in woman secondary amenorrhea. The testicular and ovarian cells suffer through hypophyseal hypofunction, which accompanies most endocrine diseases, and they also suffer when the hormonal equilibrium of the surrounding flow of liquid is disturbed. Without a correct interpretation of these facts causative therapy is unthinkable.

To demonstrate the significance of the various centers and tracts of the diencephalon I examined in Amsterdam and Paris numerous patients with the spectroreductometer and prepared endocrine electrodiagrams. A hypophyseal deviation was found in the following disease processes:

1. All hypo- and hyperfunctional disturbances, in which the hypophysis

is involved primarily or secondarily and this in primary amenorrhea, gonadotrope hyperpituitarism, hypophyseal infantilism, hypophyseal dwarfism or gigantism, obesity and emaciation, hypophyseal type of Basedow's disease, eclampsia and dystrophia adiposogenitalis.

2. Gastric and duodenal ulcers.
3. Diabetes mellitus (hypofunction of the hypophysis and pancreas).

In addition there are processes in which I suspect a hypophyseal dysfunction, but had no opportunity to investigate the diseases with the described method. I assume hyperfunction in prostatic hypertrophy, fibromata of the uterus, osteomalacia, certain forms of arthritis deformans, hysteria and chorea minor; hypofunction probably in osteoporosis, Paget's disease, certain types of disturbed chemism of the stomach (especially achylia), certain types of insufficiency of the liver and perhaps also pernicious anemia.

Even if previously one had suspected that various diseases had a central origin, as was already indicated by animal experiments, there was until now no possibility of utilizing this idea in practice for therapeutic purposes. To be sure attempts were made to influence dysfunction with roentgen rays, but this source of energy is dangerous, difficult of dosage and incalculable in its effect on slight cellular changes, which often can hardly be perceived with the microscope. This is especially the case with radiations of the ovaries on account of the danger to the organs and procreation. These objections do not apply to properly dosed short wave therapy. It is on the contrary a safe method which the patients appreciate as pleasant. In addition one has with it the advantage of systemic administration. It is only in cranial radiations that one has to be careful. It is advisable to remain within a time limit of 12 to 13 minutes, with an electrode distance of 30 cm. (metal plate distance) and an intensity of 40 watts. In hundreds of cranial radiations which I have so performed there never appeared the least damage, while in most instances unquestioned results were obtained. It was demonstrated with a phantom and the spectroreductometer that this dosage is adequate.

#### Influence of Nerve Centers

The significance of the heat regulating center and of the center of the vegetative tracts of the stomach and duodenum must be discussed at some detail.

Hamburger was unable to offer an explanation for the case of "*fièvre ovarienne*" described by him. Study of the midbrain and of the endocrine electrodiagram of various diseases renders this kind of processes clearly understandable. Numerous animal experiments have established the significance of the midbrain for heat regulation. Aronsohn and Sachs were the first to point out that animals lose the power to regulate their body temperature through a "heat puncture" into the nucleus caudatus and thalamus opticus, as into the corpus striatum (White, Aisenstadt and Steerath). Isenschmid and Schnitzler have shown that section of the hemispheres, of the corpus striatum and of the brain stem does not influence the temperature. If, however, the brain stem is cut between the thalamus opticus and the corpora quadrigemina (interbrain puncture of Citron and Leschke) the power to regulate body warmth is lost. The place which creates the disturbances is to be sought on both sides in the ventral areas of the diencephalon—the tuber cinereum and the nearest environment (the heat regulating center).

The following animal experiments are important for a correct understanding of gastric symptoms in disturbances of the diencephalon. They apply also to the problem of gastric and duodenal ulcer. Depending on which parts of the diencephalon are disturbed, there are manifest symptoms

in the gastric chemism or even ulcers of the stomach and duodenum. Schiff and Magendie observed that lesions in the area of the thalamus opticus and the crura cerebri in dogs and rabbits resulted in gastric ulcers which often perforated. Mogilnitzky and Burdenko observed after stimulation of the vegetative centers of the diencephalon, especially in the vicinity of the corpus Luysii and after stab wounds in the lateral parts of the hypothalamus hemorrhagic erosions, perforations and even chronic ulcers of the stomach. These animal experiments are in agreement with the observations of Burdenko, Korst and Mogilnitzky, who noted that complications of gastric and intestinal ulcers appeared in tumors of the mid- and interbrain. Cushing has confirmed this, and found after intracranial operations by which the nutritional and circulatory conditions in the midbrain were altered, erosions of the stomach, duodenum and esophagus.

In all patients with ulcers of the stomach and duodenum examined by me and in whom the diagnosis was confirmed roentgenologically, I was able to demonstrate hypophyseal dysfunction by means of the endocrine electrodiagram. Whether the hypophysis was the primary diseased organ which affected the vicinity or vice versa cannot be definitely stated.

Excellent results were attained also in patients who for years had elsewhere been given dietetic, rest and other cures by short wave radiations of the hypophysis and of the stomach, at first often combined with histidin injections (substitution). Knowing now from the investigations by Castle the mission fulfilled by the gastric chemism in the retention of a well functioning hemopoietic system the described short wave method of treatment is preferable to resection. Naturally this cannot be made a general proposition, for in callous ulcers, pronounced deformity of the stomach and pyloric stenosis, operation will produce more rapid results. But even here it is advisable to begin with short wave therapy. A subsequent operation is not made more difficult and can remain a last resort in stubborn cases. When it is seen that defects of the size of a palm caused by varicose ulcers of the leg are covered by monopolar short wave treatment in about six weeks with a resistant epidermis, it is proper to begin in even grave cases in which there is no immediate danger to life and health with short wave therapy which is devoid of risk.

The instrument with which we determine the endocrine electrodiagram or the cyclogram is the spectroreductometer, or in much simpler execution, the cycloscope.\* These instruments (figs. 10, 11) consist essentially of a spectroscope, a collecting lens, two perforated pads with an opening of 6 mm. in diameter, a compression forceps and a light source of about 150 candle power.

At first it will be well to work in a darkened room or under artificial light and to wait until the new metahemoglobin stripes appear and then deduct about five seconds. After some practice this is not necessary. It must be pointed out that beginners—as I have seen—show an inclination to consider the reduction when the black stripes have disappeared, while the yellow band between them is still visible. The eyes must be riveted on this yellow band. Only when this band has completely disappeared and forms with the previous black stripes a homogeneous gray band, is the reduction completed.

### Summary

The described short wave therapy of hypo- and hyperfunctional disturbances of the endocrine system, if need be at first combined with organotherapy, is a well thought out method to regulate endocrine glands

\* Both instruments can be purchased from Andersen en Polak, P. C. Hoofstr. 40 Amsterdam.

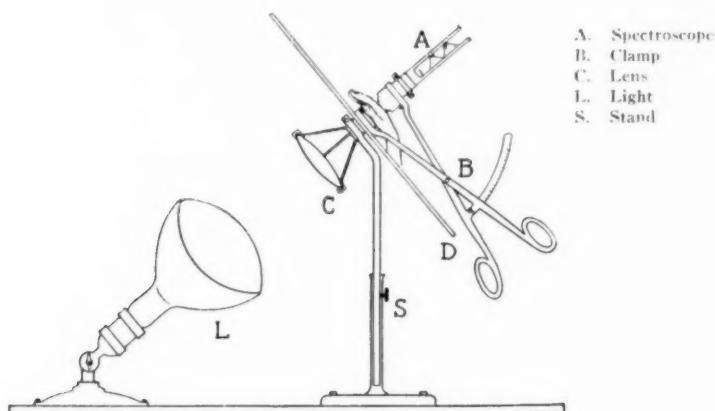


Fig. 10. — Schematic drawing of Cycloscope.

(hormone producers), consumers (the remaining body cells) and end organs. In hypofunctional disturbances the treatment consists mainly of stimulation of the complementary gland or the hypophysis and finally of the dysfunctioning gland itself for enhanced hormonal formation and stabilization of this condition. In hyperfunctional disturbances the hyperfunction at first is inhibited indirectly by stimulation of the antagonist while later a regulating effect is exerted on the dysfunctioning gland. In addition it is possible to regulate with short wave therapy dysfunctions of the hypophysis and related deviations of the diencephalon and mesencephalon, that is disease processes taking place in depth.

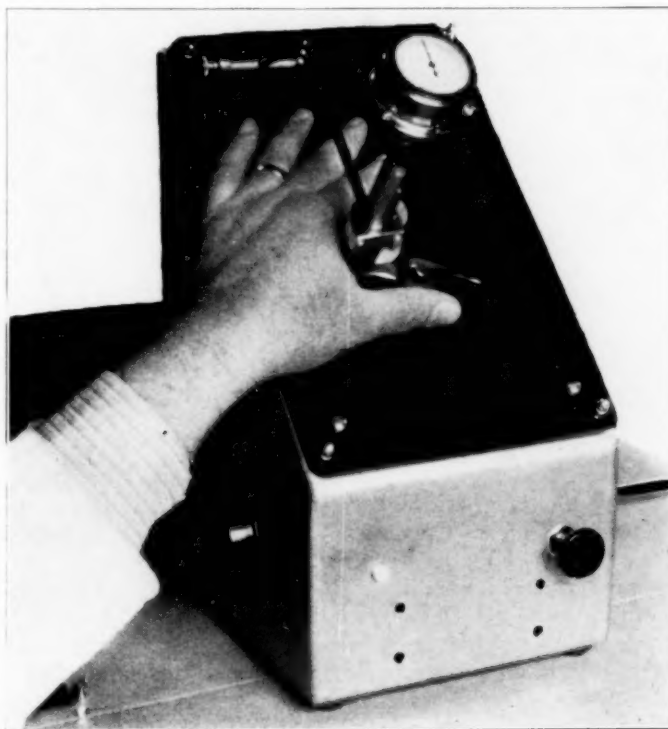


Fig. 11. — Spectroreductometer with hand in proper position for visualization of blood spectrum.



## RELATION OF AUTONOMIC NERVOUS SYSTEM TO PHYSICAL THERAPY \*

ALBERT KUNTZ, Ph.D., M.D.

Professor of Microanatomy, St. Louis University School of Medicine

ST. LOUIS, MISSOURI

The autonomic nervous system embraces all efferent neurons located outside the central nervous system and all those located within the spinal cord and brain stem through which the outlying efferent neurons are functionally connected with the central nervous system. The outlying efferent neurons, the autonomic ganglion cells, with certain exceptions, are aggregated in the autonomic ganglia. The neurons through which the autonomic ganglion cells are connected with the central nervous system, the preganglionic neurons, are visceral efferent components of the thoracic, first and second lumbar and second, third and fourth sacral spinal nerves and the third, seventh, ninth, tenth and eleventh cranial nerves. The preganglionic components of the thoracic and lumbar nerves and the ganglion cells which are functionally connected with them constitute the sympathetic division of the autonomic system; the preganglionic components of the cranial and sacral nerves and the ganglion cells functionally connected with them constitute the parasympathetic division, according to the current usage of these terms. The ganglion cells in the wall of the digestive tube are related to the parasympathetic division both anatomically and physiologically, but the enteric plexuses in which they are incorporated differ from other autonomic plexuses particularly in that they comprise local reflex mechanisms which may mediate reflex reactions independently of the central nervous system. In view of this peculiarity of the enteric plexuses it is advantageous to designate them the enteric nervous system.

In addition to the preganglionic neurons referred to above, there exist still other central neuron aggregates, particularly in the medulla oblongata and diencephalon, which are functionally related to the autonomic nerves. These have been designated the higher autonomic centers. Autonomic functions also are influenced through impulses emanating from the cerebral cortex.

Most of the visceral organs, including the salivary glands, intrinsic musculature of the eye, and the like, are innervated through both sympathetic and parasympathetic nerves. The peripheral blood vessels, sweat glands, and erector pili muscles are innervated through sympathetic, but not through parasympathetic nerves. Organs innervated through both divisions of the autonomic system exhibit characteristic responses to impulses received through the sympathetic and parasympathetic nerves, respectively. These responses in general are physiologically antagonistic. For example, cardiac rhythm is accelerated by impulses reaching the heart through the sympathetic nerves and retarded by impulses reaching the heart through the parasympathetic nerves. Gastrointestinal motility is inhibited by impulses reaching the enteric musculature through sympathetic nerves and accelerated by impulses reaching this musculature through the parasympathetic nerves. In certain organs, e. g., the eye, sympathetic nerve impulses elicit characteristic responses through one set of smooth muscle fibers, while parasympathetic

\* Read at the Mid-Western and Southern Sectional Meeting of the American Congress of Physical Therapy, St. Louis, Missouri, March 9, 1937.



nerve impulses elicit physiologically opposite responses through another set. This is illustrated by dilatation of the pupil due to contraction of the radial muscle fibers in the iris in response to sympathetic stimulation, and constriction of the pupil due to contraction of the circular muscle fibers in the iris in response to parasympathetic stimulation.

Of the organs which are innervated through sympathetic, but not through parasympathetic nerves, some, like the sweat glands, respond to nerve stimulation only according to a single mode; others, like the peripheral blood vessels, sometimes respond according to one mode and sometimes according to another. The sympathetic innervation of the sweat glands includes only fibers of like physiologic character; that of the peripheral blood vessels includes fibers of unlike physiologic character.

The mode of response of autonomic nerve stimulation is correlated with the properties of the chemical mediator liberated as a result of such stimulation. The chemical mediator commonly liberated by sympathetic stimulation possesses properties of adrenin and has been called sympathin; the one commonly liberated by parasympathetic stimulation possesses properties of acetylcholine and has been called parasympathin. Fibers whose stimulation results in the liberation of an adrenin-like mediator, consequently may be called adrenergic, and those whose stimulation results in the liberation of an acetylcholine-like mediator, cholinergic. The fibers of sympathetic and parasympathetic origin, are not mutually exclusive with regard to the chemical mediators. For example, stimulation of the sympathetic fibers which mediate constriction of the peripheral blood vessels results in the liberation of sympathin, while stimulation of those which mediate dilatation of the peripheral blood vessels results in the liberation of a chemical mediator with the properties of parasympathin. The responses elicited by stimulation of the latter fibers obviously belong to the same category as those elicited by stimulation of parasympathetic nerves.

The peripheral vasodilator fibers probably are not all alike with regard to the chemical mediator liberated due to impulses conducted by them. According to Büllbring and Burn<sup>1</sup> (1936) stimulation of the vasodilator fibers supplying the vessels in the skeletal muscles of the dog results in the liberation of a substance with properties of acetylcholine, while stimulation of those supplying the cutaneous vessels does not. The vasodilator fibers supplying the vessels of the intestine, according to their findings, are like those of the cutaneous vessels with regard to the chemical mediator. They also reported data which support the assumption that the sympathetic innervation of the intestine includes vasodilator fibers. According to Wyman and Suden<sup>2</sup> (1936), some of the vasodilator fibers in both the peripheral and splanchnic areas in the rat and the cat belong to the category of those whose stimulation results in the liberation of a chemical mediator with properties of adrenin.

Most of the reactions carried out through the autonomic nerves are essentially reflex. Reflex connections with the preganglionic neurons are effected by both visceral and somatic afferent components of the cerebrospinal nerves; consequently, autonomic reflex reactions may be elicited by afferent impulses arising in any part of the body. Impulses emanating from the cerebral cortex and particularly from the higher autonomic centers in the brain stem also elicit responses through the autonomic nerves.

#### **Basis of Somato-Visceral Interactions**

By virtue of the reflex connections of afferent components of the cerebrospinal with the autonomic nerves, visceral functions may be influenced reflexly by diverse stimuli applied at the surface of the body or in the so-

matic tissues. Afferent impulses integrated at various levels in the brain stem and in the cerebral cortex also result in discharges from the higher autonomic centers which influence visceral functions. The efficacy of physical therapy in the treatment of disease depends both on the direct reflex effects of the stimulating agents employed and the influence of these agents exerted through the higher autonomic centers. The deep application of heat by means of short wave currents probably results in direct stimulation of the autonomic nerve fibers or the tissues in question, but reflex reactions due to this form of stimulation are not precluded, since the changes effected in the tissues heated may give rise to stimuli which act upon receptors in the heated area or adjacent to it.

### Splanchno-Peripheral Blood Volume Ratio

Some of the most marked effects of somatic stimulation on visceral functions are brought about through the circulatory organs. The reciprocal reactions of the peripheral and splanchnic vascular beds are well known. For example, subjection of the body to high external temperature elicits vasodilatation at the periphery and vasoconstriction in the splanchnic area. On the contrary, subjection of the body to low external temperature elicits vasoconstriction at the periphery and vasodilatation in the splanchnic area.

The relatively high incidence of gastrointestinal infections in warm climates and during hot weather may be explained most satisfactorily on the basis of the splanchno-peripheral blood volume ratio. While the body is subjected to high temperature, the peripheral vessels are dilated more or less constantly and the blood supply to the gastrointestinal tract is correspondingly diminished; consequently, the local resistance of the gastrointestinal mucosa is reduced. Susceptibility to gastrointestinal infection, not only by highly virulent pathogenic organisms but also by the normal gastrointestinal parasitic flora, is notably increased during periods of high environmental temperature. This does not necessarily depend on the actual degree of the external temperature, but on the reactivity of the vasomotor system at the time. The splanchno-peripheral imbalance usually is most marked at the beginning of the warmer periods of the year and when persons enter a tropical region from a colder one. Adaptation to the higher temperatures involves readjustment of the splanchno-peripheral autonomic balance.

In the general splanchno-peripheral interactions of the body the tonic state of the vessels in the abdominal and pelvic organs is opposed to that of the vessels in the extraperitoneal organs and tissues. The vascular condition of the buccal and respiratory mucous membranes, consequently, corresponds to that of the skin. Under physiologic conditions, particularly while the body is at rest, the abdominal and pelvic organs are more abundantly supplied with blood than the extraperitoneal structures. Muscular exercise or increased external temperature brings about a change in the blood volume ratio in favor of the peripheral structures. Exposure of the body to low temperature, particularly in the absence of muscular exercise, results in peripheral vasoconstriction with corresponding ischemia of the buccal and respiratory mucous membranes as well as of the skin.

Although infective organisms probably always are present on the mucous membranes, the local resistance usually is sufficient, under normal physiologic conditions, to prevent infection. Reduction of the local resistance due to prolonged ischemia of the mucous membranes favors infection. This is well illustrated in upper respiratory infections following exposure to low temperatures or cool air currents. Other mucous membrane infections, e. g., herpes associated with fever or conjunctivitis associated with an exacerbation of a localized pulmonary tuberculosis, can be explained most satisfac-

torily on the same basis, since they arise during periods of reduced local resistance due to temporary ischemia of the tissues involved. The efficacy of the application of external heat in the reduction of respiratory and other mucous membrane infections probably depends mainly on the increased local resistance due to the hyperemia of the mucous membranes brought about by the thermal stimulation.

#### Reactions to Localized Peripheral Stimulation

The beneficial effect of localized thermal stimulation of an inflamed joint or a localized cutaneous area of inflammation depends mainly on the reflex vasodilation produced. Stimulation of receptors in the area involved by the effects of an inflammatory process commonly results in reflex vasoconstriction in that area. The resulting ischemia probably is a major factor in the causation of pain. The assumption that vasoconstriction not infrequently gives rise to pain is supported by extensive clinical and experimental data, but there is no general agreement regarding the stimulating agent that acts on the pain receptors, except that it is a chemical substance. According to Katz, Lindner and Landt<sup>3</sup> (1935), this substance is acid and diffuses into the blood. It also is nonvolatile, since it remains active after passing through the lungs. The pain stimulating substance produced in exercising skeletal muscles with a limited blood supply, according to Elliott and Evans<sup>4</sup> (1936), possesses properties of lactic acid. It obviously is a product of muscle metabolism, which, in the presence of normal circulation, does not accumulate in sufficient concentration to stimulate the pain receptors except during intense muscular activity. If pain associated with ischemia arises by reason of failure of the circulating blood to remove the stimulating agent, its alleviation by the local application of heat or another cutaneous stimulant which elicits vasodilatation in the painful area can be explained most satisfactorily on the assumption that the increased volume of blood circulating through the tissues reduces the concentration of the stimulating agent to a level below that which is required to stimulate the pain receptors. The local resistance of the tissues also is increased by the more abundant blood supply and the processes of reparation are accelerated.

The principle of counterirritation, long recognized and applied in the practice of medicine, is based on cutaneo-visceral reflexes. In a fluoroscopic study of the effects on gastric tonus and motility of localized thermal stimulation of the skin, Freude and Ruhmann<sup>5</sup> (1926) observed that such stimulation in the epigastric area elicited gastric responses within a few seconds. Cold applications first inhibit gastric peristalsis, but after a short interval elicit irregular short peristaltic waves and retardation or cessation of the activity of the pyloric sphincter. Hot applications stimulate gastric peristalsis and elicit more frequent opening of the pylorus. They also inhibit pre-existing hyperperistalsis. If the tonus of the gastric musculature is normal or subnormal, it is still further depressed by cold applications, but augmented by hot ones. On the contrary, if the gastric musculature is hyper-tonic, its tonicity is still further exaggerated by cold applications but inhibited by hot ones. Gastric heterotonicity also is aggravated by cold applications and alleviated by hot ones. In general, according to their findings, the effect on the gastric musculature of cold applications is similar to that of sympathetic stimulation, and the effect of hot applications to that of parasympathetic stimulation.

Experimental observations reported by Ruhmann<sup>6-7</sup> (1927) indicate that visceral reactions comparable to those elicited by localized thermal cutaneous stimulation may also be elicited by localized mechanical or chemical stimulation of the skin. The visceral response appears only after a change in

the tonic state of the cutaneous vessels in the area stimulated has taken place. The blood vessels in the viscus affected, furthermore, undergo a change in tonus corresponding to that of the cutaneous vessels in the stimulated area. Localized cutaneous hyperemia, consequently, is accompanied by hyperemia of the corresponding viscus; localized ischemia, by ischemia of the corresponding viscus. These findings are in full accord with the observation of Boas<sup>8</sup> (1926) that hot applications in the epigastric region may provoke bleeding of a peptic ulcer, the existence of which had not been known. He recommended the use of hot applications in the epigastric area as a diagnostic measure in cases of suspected peptic ulcer. This procedure obviously is fraught with the danger of excessive bleeding. In cases of peptic ulcer in which hot applications do not provoke bleeding, the hyperemia produced undoubtedly augments the healing process. The effectiveness of cold applications in the treatment of bleeding peptic ulcers depends on the reflex vasoconstriction brought about in the ulcerated area and adjacent to it.

Reflex responses in other visceral organs also may be elicited by localized stimulation in the corresponding cutaneous areas.<sup>9</sup> These responses probably always involve the vasomotor nerves. The direct reflex response to the cutaneous stimulation is a change in the tonus of the blood vessels in the cutaneous area stimulated. This response may afford the stimulus for segmental reflexes to the corresponding viscera. On the other hand, the afferent neurons which conduct impulses from the skin probably also direct reflex connections with preganglionic neurons involved in the efferent innervation of the viscera. The vascular responses in the viscera, like the responses of the musculature of the organs which correspond to responses elicited by direct sympathetic stimulation, can be explained on the basis of purely segmental reflexes, since, according to the findings of Bülbring and Burn and Wyman and Suden cited above, the sympathetic nerves to the abdominal viscera include vasoconstrictor and vasodilator fibers. The muscular responses of the viscera which correspond to those elicited by direct parasympathetic stimulation undoubtedly involve segmental reflex mechanisms, but cannot be fully explained on the basis of only segmental reflexes.

The alleviation of visceral pain by means of any stimulating agent applied to the skin which elicits localized peripheral vasodilatation probably depends mainly on the associated visceral hyperemia. Visceral pain, like somatic pain, not uncommonly is associated with ischemia of the organ or tissues in question. The pain receptors involved are stimulated by a chemical substance which accumulates in the tissues because the circulation is insufficient to remove it. The functional activity of the vasomotor nerves, consequently, plays a major rôle both in the causation of visceral pain and in its alleviation. Functional imbalance of the autonomic nerves obviously is an important etiologic factor in many lesions, both in the visceral organs and the somatic structures. Restoration of the autonomic balance, consequently, must be regarded as an important aim in the therapeutic treatment of such lesions.

1402 S. Grand Blvd.

#### References

1. Bülbring, E., and Burns, J. H.: Sympathetic Vasodilatation in Skin and Intestine of Dog, *J. Physiol.* **87**:254 (Aug. 19) 1936.
2. Wyman, L., and Suden, C.: Distribution of Adrenergic Vasodilators in the Rat, *Am. J. Physiol.* **116**:182 (June) 1936.
3. Katz, L. N., Lindner, E., and Landt, H.: On the Nature of the Substance(s) Producing Pain in Contracting Skeletal Muscle; Its Bearing on Problems of Angina Pectoris and Intermittent Claudication, *J. Clin. Investigation* **14**:807 (Nov.) 1935.
4. Elliott, A. H., and Evans, R. D.: Ischemic Pain in Exercising Muscle, *Am. Heart J.* **12**:674 (Dec.) 1936.

5. Freude, E., and Ruhmann, W.: Das thermoreflektorische Verhalten von Tonus und Kinetik am Magen, *Ztschr. f. d. ges. exp. Med.* 52:338, 1926.

6. Ruhmann, W.: Über viscerale Reflexe auf lokale thermische Hautreize; der segmentäre Reflexablauf von der Haut zum Eingerweide, *Ztschr. f. d. ges. exp. Med.* 57:740, 1927.

7. —————: Über viscerale Reflexe auf lokale thermische Hautreize; viscerale Schmerzlinderung durch die Wärme als Segmentreflex, *Ztschr. f. d. ges. exp. Med.* 57:768, 1927.

8. Boas, I.: Über provokatorische okkulte Blutungen, *Deutsch. med. Wehnschr.* 52:349, 1926.

9. Kuntz, A.: "The Autonomic Nervous System," second edition, Philadelphia, Lea & Febiger, 1934.

## THE ELLIOTT TREATMENT IN PROSTATIC DISORDERS \*

LEANDER WILLIAM RIBA, M.D.

and

CYRIL VANCE, M.D.

CHICAGO

Local heat in the treatment of prostatic disorders is not a new therapeutic agent, for it has been utilized for many centuries. Everyone who is interested in the amelioration of prostatic symptoms employs heat in some form or another. Hot sitz baths, hot rectal irrigations, hot water instillations, electrical and mechanical prostatic heaters are only too familiar to most of us. It would be interesting to know the yearly investment made for prostatic appliances by those so afflicted. No doubt the sum would be astonishing. Several years ago the wife of a prostatectomized patient stated that the amount of money her husband had invested for prostatic appliances had exceeded the entire expense of the surgical procedure. The fact that so many of them are sold speaks for itself. Considerable benefit must be derived from their use. Because this field has been so widely exploited, one naturally should be hesitant about recommending anything new. Granting, however, that the use of local heat to the prostate is the sheet-anchor of our present day symptomatic therapy, any additional refinement in its application should be worthy of some discussion.

One of our chief reasons for applying heat to an infected member or organ is to promote an increase in the local blood supply, commonly known as active hyperemia. This increased blood supply speeds up the physiologic response to infection, and materially aids in the resolution or localization of the process. We know that the prostate, the base of the bladder and rectum are rather generously supplied with blood from different sources. We also know that a free anastomosis exists between the superior hemorrhoidal artery (the terminal inferior mesenteric), the middle hemorrhoidal (a branch of the hypogastric), and the inferior hemorrhoidal (a branch of the internal pudendal). Therefore, it should be possible to materially increase the blood flow to the prostate and seminal vesicles by applying heat rectally.

\* From the Departments of Physiology and Genito-Urinary Surgery, Northwestern University Medical School and Passavant Memorial Hospital, Chicago, Illinois.

\* Read at the Mid-Western and Southern Sectional Meeting of the American Congress of Physical Therapy, St. Louis, Missouri, March 9, 1937.



### Effects of the Elliott Treatment

The Elliott machine, in principle, is a compact, thermostatically controlled water bath. The reservoir capacity is two quarts. The circulation of the water through a flattened, soft rubber, distensible bag is maintained by an electric pump. The applicator is readily detachable and interchangeable to conform to the organ to be treated.

Ivy, Beazell and Schmidt<sup>1</sup> during the past year at the Northwestern Medical School, performed a number of experiments upon heparinized dogs actually measuring the increase of blood flow through the colonic or an isolated portion of small intestinal vessels. They found that by inserting a properly fitting Elliott bag within the lumen of the gut, the blood flow was doubled and in some cases quadrupled. They also noted a marked increase in the secretion of succus entericus, but no increase in the lymph flow except when the mucosa was injured. This injury could be brought about if the bag was too large or when the temperature was increased above 52.2 degrees C. (126 degrees F.). In the presence of mucosal injury, a decrease in blood flow was observed. Ivy's paper soon to be published, states: "From a practical viewpoint our results show that if proper precautions, both as to the applicator size and shape, and as to contractile response, the temperature in the applicator may be safely raised to 52.2 degrees without causing gross injury to the colonic or intestinal mucosa. Higher applicator temperatures are not safe."

The question naturally arises concerning the dissipation of the heat applied in this manner. In 16 dogs, we have found that the average temperature of the pelvic gut opposite the rectal applicator was raised to 106 degrees F., while the applicator temperature was being maintained at 130 degrees F. The mean temperature between these two readings should represent the actual temperature between the mucosa and the applicator. A thermometer inserted beside the applicator usually reads from 10 to 12 degrees lower than the water temperature circulating through it (fig. 1).

In some experimental animals, as the dog or rat, there is a constant secretion of prostatic fluid. Whether or not there would be an increase in the prostatic secretion flow during Elliott treatments was studied in 20 dogs. The membranous urethra of a nembutal-anesthetized dog was ligated. A cannula was inserted into the prostatic urethra through the bladder. The rate of flow was observed for one hour each, before, during and after treatment. There was no significant change noted in the prostatic secretion flow during these experiments, as determined with Owen's automatic drop counter.

The value of Elliott treatments in female pelvic infections has been favorably reported upon within the past five years. Counseller<sup>2</sup>, Graham<sup>3</sup>, Mussey<sup>4</sup>, Preece<sup>5</sup>, Black<sup>6</sup>, Revell<sup>7</sup>, Doan and Simpson<sup>8</sup>, Holden and Gurnee<sup>9</sup>, and others feel that this method has a distinct place in the management of acute and chronic female pelvic infections. Herring<sup>10</sup> is the only writer who takes the opposite view. He still favors diathermy.

The good results obtained in female pelvic infections suggests the probabilities of value in prostatic disorders. In 1932, Michel and Traube<sup>11</sup> first suggested the Elliott bag in the treatment of prostatitis and prostatic abscess. Lewis<sup>12</sup> last year reported his experience with this method in 80 unselected cases. His results were "uniformly good in acutely inflamed prostates," and not as striking in the chronic type. He recommended the Elliott treatment as "an effective addition to the urologic armamentarium." Our work was started in September, 1935. After one year the results of 82 unselected treated cases were published<sup>13</sup>. It was soon noted that the



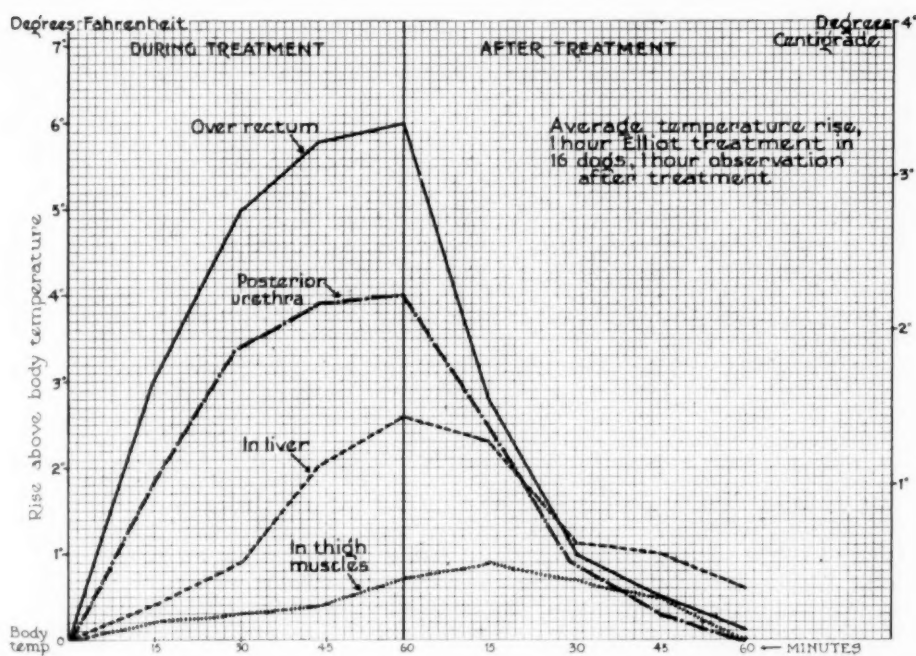


Fig. 1.—The average temperature rise in 16 dogs recorded in the pelvis, posterior urethra, liver and thigh muscles during one hour Elliott treatment and one hour observation after treatment.

Elliott method was not a "cure-all" for prostatic disease. In fact the typical chronic prostatitis-vesiculitis clinic patient was benefited the least of all. One needs only to recall the pathology of these long standing, diffusely infected prostates to appreciate why these results would naturally follow. In our chronic prostatitis-vesiculitis group, 73 per cent of the cases derived little or no benefit from these treatments. With more experience with this method it was noted that certain types of prostatic infections responded remarkably well. In fact, as a group, the best response seems to be obtained in those cases where local treatment, as a rule, is contraindicated.

#### Technic

The following technic has been used and found practical in the administration of Elliott treatments. Patients are asked to come with an empty rectum. The bladder should be emptied before a treatment is given. The bag may be inserted while the patient is lying on his back with the thighs flexed. At times it is a little easier to have the patient assume the typical knee-chest posture. In this position, if indicated, the prostate may first be massaged and secretion obtained for examination. The rectum should be well greased with K-Y jelly. The bag is then rolled up from each side, so as to form a semi-rigid tubular mass. Care should be taken when inserting the bag, particularly when hemorrhoids are present. The rubber tubes from the machine may now be securely attached to the bag and the pressure turned on. The gauge should register between 2 and 3 pounds. The return flow tube is momentarily blocked with the fingers to insure adequate distension of the applicator. The initial machine temperature should be about 110 degrees F. During the first treatment the temperature may be safely increased to 120 degrees F. and should last at least 30 minutes. Subsequent treatments may be prolonged to 45 or 60 minutes. The maximum temperature now employed varies between 126 and 130 degrees F.,

depending upon the tolerance of the individual. Patients should be comfortable while taking the treatment.

When pain or rectal spasm is produced, the following may be the cause: (1) improperly placed bag, (2) too large a bag, (3) too high a temperature, (4) spasms due to hemorrhoids, or (5) large amount of feces in the lower rectum. To terminate a treatment, suction is used while the bag is withdrawn. The bag should then be thoroughly cleansed with soap and a finger brush followed by boiling for a few minutes. Treatments may be given daily, once, twice or three times a week, depending upon the existing pathologic process and the response obtained. All other recognized indicated therapeutic measures are not to be forgotten or discouraged such as: Hot sitz baths, internal medication, local treatment and the like.

### Clinical Indications

In the following urological disorders Elliott treatments have been of distinct value.

*Prostatic Abscess.* — While resident in Urology at the Cook County Hospital (L. W. R.), one of the attending urologists advocated the opening of all large diffusely infected prostates, even if there was only a suspicion of an abscess. In recalling some of these drained cases, one could not help being impressed by their rather septic postoperative course and complications. When a parenchymatous abscess is present and definite fluctuation noted per rectum, surgical drainage is imperative. However, if a small suburethral or periurethral abscess is present, immediate surgical drainage may well be questioned. Ten years of conservative management in some of these cases has convinced one of us (L. W. R.) of its merit and most of them have been spontaneously evacuated into the deep urethra. At the present time localization or resolution can be materially aided if in addition daily Elliott treatments are given per rectum. Should posterior softening become evident during the course of this conservative management, surgical drainage becomes necessary.

*Acute or Subacute Prostatitis-Vesiculitis.* — The accepted treatment for acute prostatitis-vesiculitis at the present time is conservation. This consists of rest, hot sitz baths, hot rectal irrigations or instillations, scrotal support, urinary antiseptics and sedatives, no local treatment and watching the prostate for fluctuation. Improvement of symptoms and comfort are brought about by these measures, particularly the hot sitz baths, rectal irrigations and sedatives. It is unreasonable to recommend discarding this method of treatment because in the majority of instances good results are obtained. However, if we can lend additional aid to the natural reparative processes and shorten the course of the infection, we may reduce the incidence of residual and chronic prostatitis. Those of us who see some of these long standing, incurable prostatitis patients should lend an ear in this direction. Properly administered Elliott treatment is a definite adjunct in the management of acute and subacute prostatitis-vesiculitis, either specific or non-specific in character.

*Chronic Prostatitis-Vesiculitis With Arthritis.* — When arthritis complicates a prostatitis-vesicular focus, at least in some instances, the seminal vesicle is the real offending focus. Drainage from an infected seminal vesicle through a small ejaculatory duct can readily become inadequate. Drainage, however, can be assisted by mechanical "stripping." Anatomically some of the openings of the glandular sacculations of the vesicle point away from the drainage duct, so that by the usual "stripping" of the vesicle towards the urethra it becomes obvious that all of the infected material cannot be expressed in this manner. With the best of care this type of case can be

come very refractory to our therapy. Any additional safe conservative procedures which may shorten a course of seminal vesiculitis or aid in its resolution merit consideration. Eleven out of 16 patients (73 per cent) in our series obtained moderate to marked benefit from the Elliott treatments. In this group the selection of cases should be very carefully made. When a vesicular focus is present which is primarily responsible for arthritic involvement, improvement from the Elliott method may be anticipated.

*Surgical Infected Prostates.*—Surgery of the prostate in the presence of infection is perhaps the rule. The degree of infection may vary from a few pus cells to a high grade pyuria. Postoperative morbidity and mortality can be influenced to a great extent by the amount of infection. Barring accidents, patients with a clear urine as a group are better operative risks than those with a cloudy urine. To rid an obstructive prostate of his high grade pyuria before operation is at times impossible on account of a co-existing complication. At other times it can and should be done. The Elliott bag and other pre-operative measures, including ketogenic diet and mandelic acid, should be given a trial in cases of uncomplicated persistent purulent prostatic infections. In cases where this regimen has been carefully followed marked improvement in symptoms and degree of infection has been noted. This improvement, however, being only temporary, surgery should follow if and when indicated.

That pyuria is a frequent sequel of prostatic resections is generally known. That it seemingly resists all our therapeutic efforts at times must be admitted. Persistent pyuria following a prostatic resection is not an excellent postoperative result, even though the patient may be able to empty the bladder. In these most stubborn cases some help may be obtained by the use of the Elliott bag.

*Chronic Prostatitis-Vesiculitis.*—Considerable progress has been made in the treatment of chronic prostatitis-vesiculitis. Many cases will improve on prostatic massages, stripping of the seminal vesicles, heat by rectal irrigations, sitz baths and prostatic heaters. Others may be improved by correcting the associated pathologic process, such as: Urethral strictures, posterior urethral granulations or cysts, cauterization of prostatic ducts, resection of bars or contractures, elimination of renal or ureteral disease, removal of distal foci (teeth or tonsils), gallbladder or intestinal foci. Grant<sup>14</sup> recently revived intra-prostatic injections. O'Connor<sup>15</sup> has shown experimentally that this procedure causes a complete atrophy of the prostatic acini in dogs.

After all these procedures have been carried out there still remains a group of patients in whom symptoms and findings continue. It would seem reasonable that if we can improve our therapy during the initial infection of the prostate, and clinically cure more of them during this phase we might have fewer incurable prostatitis in the future.

*Miscellaneous Cases.*—Recently two cases of severe gonorrheal epididymitis were treated rectally with surprising relief of symptoms and findings. A severe epididymitis is usually secondary to an active or suppurating seminal vesiculitis. With this in mind increasing the blood flow through an infected seminal vesicle should be reflected by improvement in the epididymitis. One patient with interstitial cystitis was given daily vaginal Elliott treatments following light fulguration of the bladder ulcers and urethra. Her relief was so marked that she considered purchasing an Elliott machine. Another case of incrustating cystitis in a female pregnant three months obtained marked relief from a few vaginal treatments after the usual therapy usually employed had failed.

### Discussion

Reiterating the use of heat in the treatment of prostatic disorders is not new. Kretschmer<sup>16</sup> recently reporting upon the treatment of 1,000 cases of chronic prostatitis recommended primarily massages and local heat. Patients afflicted with acute prostatic-vesiculitis are frequently advised to inject 6 to 8 ounces of hot water into the rectum at home in the sitting position to be retained for 10 to 15 minutes. The effectiveness of this therapy was investigated by taking temperatures following this technic, when it was found that the heat was dissipated within 2 or 3 minutes. We also found that with continuous hot rectal irrigations a temperature of 118 to 120 degrees F. could be maintained for 45 to 60 minutes (fig. 2), granting that

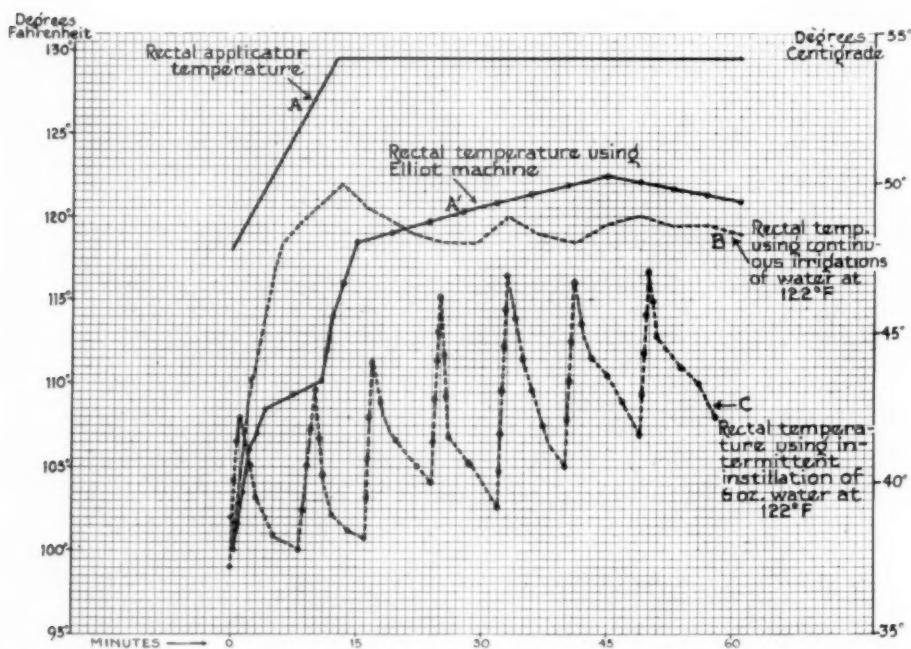


Fig. 2.—Rectal temperature charts following application of heat rectally for 1 hour. A = (heavy black line) application temperature—Elliott machine; A' = (knotted black line) rectal temperature with thermometer alongside of the applicator; B = (broken line) rectal temperature using continuous irrigations of water at 122° F.; C = (broken knotted line) rectal temperature using intermittent instillations of 6 oz. water at 122° F.

properly administered continuous rectal irrigations are efficient, they can become laborious for innumerable reasons. Just how well the dissemination of the irrigating fluid was controlled was studied by substituting a weak barium solution. In an x-ray film taken after a 20-minute rectal irrigation it was noted that this fluid may readily retrograde to the cecum (fig. 3).

The Elliott method with its simplicity of operation is an effective, practical way of applying controlled heat to the prostate gland. Patients vary as to their individual response and tolerance. Pain should not be produced. When rectal spasms occur treatments should be discontinued until proper adjustments are made. Hemorrhoids may be aggravated during the treatments. No known serious complications resulted in over 2,100 treatments. Proctoscopic examination of 5 patients immediately after an hour's treatment at 130 degrees F. revealed no mucosal injury. An excess of mucus is always present and may act as a mucosal defense. Ivy's observation of no increase in lymph flow in the presence of an active hyperemia

is interesting. His experimental findings help to substantiate the clinical application and limitations of this method. We believe that this method of treating infected prostates is equal to the fever therapy (hyperpyrexia) now in vogue, without its inherent dangers. An insufficient number of cases have been treated to permit conclusive opinions.



Fig. 3.—X-ray film after 20 minutes continuous irrigation with hot barium solution. Patient lying on his back.

### Conclusions

1. The Elliott treatments are particularly adaptable to acute infections of the prostate and seminal vesicles, especially where local therapy is contra-indicated.
2. Arthritic pains due to a prostatic-vesicular focus can be relieved in the majority of cases and the original focus improved.
3. Urinary infections with symptoms due to an enlarged prostate may be improved preoperatively and resolution aided in post-resection cases.
4. Daily treatments, if possible, of thirty, forty-five and sixty minutes are preferable.
5. This method of treating infected prostates is practical and reasonably safe. The Elliott machine is reliable and very simple to operate.
6. As the result of this study, at the present time the Elliott bag is the most efficient method for applying controlled heat to the prostatic gland.

700 N. Michigan Avenue.

### References

1. Ivy, A. C.; Beazell, James, and Schmidt, C. R.: Personal Communication.
2. Counseller, V. S.: Treatment of Chronic Infections of Pelvis: Consideration of Elliott Treatment, *J. A. M. A.* **101**:916 (Sept. 16) 1933.
3. Graham, H. F.: Elliott Treatment of Pelvic Inflammation, *Am. J. Surg.* **16**: 423 (June) 1932.
4. Mussey, R. D.: Elliott Treatment of Inflammatory Diseases, *M. Clin. North America* **18**:423 (Sept.) 1934.
5. Preece, A. A.: Elliott Heat Treatments in Infections, *M. Ann. District of Columbia* **4**:38 (Feb.) 1935.
6. Black, C. V.: Gonorrheal Infections in Female. Use of Elliott Treatment and Theelin, *Female Sex Hormone*, *J. Kansas M. Soc.* **36**:56 (Feb.) 1935.



7. Revell, A. J.: Therapeutic Effect of Heat as Applied with Elliott Treatment Regulator, *J. Kansas M. Soc.* **36**:497 (Dec.) 1935.
8. Doan, R. C., and Simpson, Wm.: Elliott Treatment of Pelvic Inflammatory Disease. Report of 101 Cases, *Am. J. Surg.* **28**:78 (April) 1935.
9. Holden, F. C., and Gurnee, W. S.: Elliott Treatment: New Method of Applying Vaginal Heat, *Am. J. Obst. & Gynec.* **22**:87 (July) 1931.
10. Herring, J. B.: Therapeutic Hyperpyrexia of Pelvic Organs; Comparative Study of Temperatures Produced by Elliott, Diathermy and Other Methods, *Urol. & Cutan. Rev.* **39**:449 (July) 1935.
11. Michel, L. L., and Taube, N.: Elliott Method of Treating Pelvic Infections in Male and Female, *Urol. & Cutan. Rev.* **39**:237 (April) 1935.
12. Lewis, Lloyd G.: Treatment of Prostatitis by Local Heat: Elliott Treatment Regulator, *J. Urol.* **35**:681 (June) 1936.
13. Riba, Leander W.: Elliott Machine in Treatment of Prostatitis, *Illinois M. J.* **70**:444 (Nov.) 1936.
14. Grant, Owsley: Treatment of Chronic Prostatitis by Injection, *J. Urol.* **33**:631 (June) 1935.
15. O'Connor, Vincent J., and Ladd, Robert L.: Intraprostatic Injections, *J. A. M. A.* **105**:1185 (Oct. 10) 1936.
16. Kretschmer, Herman; Berkey, H. A.; Heckel, Norris J., and Ockuly, E. A.: Chronic Prostatitis, 1,000 Cases, *Illinois M. J.* **71**:152 (Feb.) 1937.
17. Sanders, J. T., and Sellers, T. B.: Treatment of Acute and Subacute Infection of Pelvis With Special Reference to Elliott Treatment, *New Orleans M. & S. J.* **87**:368 (Dec.) 1934.
18. Randall, L. M., and Counseller, V. S.: Treatment of Pelvic Inflammation by Heat (Elliott Treatment); Indication and Results, *Minnesota Med.* **18**:1 (Jan.) 1935.
19. Emmett, J. L.: Elliott Treatment of Chronic Urethritis of Women. Preliminary Report, *Proc. Staff Meet. Mayo Clin.* **10**:545 (Aug. 28) 1935.
20. Stacy, L. J.: Elliott Treatment of Infection, *Physiotherapy, Rev.* **15**:63 (March-April) 1935.
21. Elliott Treatment Machine Acceptable: Report of Council on Physical Therapy, *J. A. M. M.* **104**:1923 (Dec. 5) 1935.

### Discussion

**Dr. G. M. Blech** (Chicago): Toward the end of the last century medical science received a new impetus in the problem of inflammation, the ingenious studies of August Bier having shown that inflammation is not something hostile requiring antiphlogistic management, but a biologic reaction of defense which should be enhanced within limits. Since then much time has elapsed and much work has been done in the field of infection and inflammation, and I feel that the involved problems have not yet been fully solved. Bier has differentiated between active, passive and mixed hyperemia. He has shown that either type can be utilized as a therapeutic agent. We need only think of the almost incredible achievement of relieving acute gonococcal arthritis by simple congestion within a very few minutes when before the merest touch brought about the most excruciating pain, to appreciate that under certain conditions passive hyperemia is at once an analgesic, an antitoxin and even a preventive of ankylosis. But hyperemia cannot and will not cure all types of surgical infection. Why? Because there is infection and infection. I have reference to an old saying of the older physicians about pus being good and laudable, which today will elicit a pitying smile from a recent graduate. Pus is neither good nor desirable. Empirically our elders spoke of "pus bonum et laudabile," because they recognized that when the leukocytes had time to

break down, life was virtually safe, while in the acute infections that ran a brief course without typical abscess formation they saw a probable fatality. I do not think the situation has changed very much to this day. In spite of our modern advances in therapy we are just as helpless in controlling foudroyant infection especially of the streptococcal type as were our forefathers.

With this in view we realize that the treatment presented by the essayist is heat, or active hyperemia in the sense of Professor Bier's grouping. Like most surgeons I dislike cumbersome machinery. It is bred in the flesh and blood of every real surgeon to display even in technically difficult operations as little hardware as possible. The Elliott treatment requires a specially constructed apparatus, which while not altogether fool proof offers certain advantages as compared with simpler devices. Taking prostatitis for illustration, the common treatment has been sitz-baths, injections of hot water in the rectum, rectal suppositories and the like. The Elliott apparatus apparently has been devised to carry controlled intensities of dry heat into orifices, so that one can have hot water run against the prostate for local heating as long as may be necessary and within any desired range of temperature. At the same time short wave diathermy has been long enough with us to lay claim to citizenship on the ground of producing hyperemia locally or diffuse-

ly and being applicable even in the presence of suppurative processes. Even surgeons have now to admit that in many cases of superficial and deep infections short wave therapy has reduced the necessity for operative intervention both in frequency and extent. While this form of active hyperemia has the advantage over all known technical devices because of its ability of producing hyperemia in depth, it no doubt has biologic peculiarities which do not render it universally applicable. The excellent results obtained by the essayist suggest the question which of the two methods of carrying heat to an inflamed accessible organ or structure is more effective. Theories come after facts, and so I feel that it is only by parallel observations that this problem can and must be definitely solved.

**Dr. Rogers Deakin** (St. Louis): All of us but particularly the urologists, should be grateful to Dr. Riba for his report. There is no condition which a urologist is called upon to treat about which he takes more "ribbing" from his colleagues than that of chronic prostatitis. It is, all too often, a very discouraging struggle to rid these patients of their symptoms and local findings, discouraging to the urologist, to the referring physician, and last but not least, to the patient himself. At the same time, when one considers the anatomy of the gland, it can be readily seen that the very structure of the prostate and seminal vesicles precludes good drainage. And every one knows how important adequate drainage is in any inflammatory process. I think it is to the credit of the urologists that they continue to try to devise more efficient methods for the treatment of prostatic inflammation or to utilize, wherever possible, appliances or techniques that have been successful in combating infections elsewhere. This report is an example of such effort and contains very welcome information to all of us.

The adaptation of the Elliott apparatus for use in prostatic inflammation is a logical outgrowth of its reputed success in the pelvic inflammations of women. The technic used, the safeguards employed, and the results obtained are of interest.

I think Dr. Riba is to be complimented on the obvious effort he has made to make it a safe and practical adjunct to our routine treatment. I am sure all of us are a bit disappointed that the results in chronic prostatitis-vesiculitis have not been more encouraging, but, as Dr. Riba has pointed out, if the employment of the technic in acute conditions brings about speedier and surer cures in early prostatitis-vesiculitis, we may look forward to fewer cases of the stubborn chronic variety, and that alone makes the procedure worth while.

I should like to ask Dr. Riba if he feels that this method is adaptable to routine office practice. I am sure that one reason for the general lack of interest toward diathermy in prostatitis was the time which had to be allotted to an ambulatory office patient as well as the number of rooms required in order that any sizable group of patients could receive treatment in the office. Does Dr. Riba feel that the procedure is feasible for the average urologist in modest quarters, or is it after all, better quartered in a physiotherapy or special department of a hospital or clinic?

**Dr. Leander W. Riba** (closing): Regarding the question raised by Dr. Blech, comparing Elliott treatments with short wave diathermy, we have had an opportunity to compare short wave diathermy in some of these unselected cases in the clinic with Elliott treatments, and we felt that the short wave diathermy did not accomplish as much as the Elliott treatments.

In regard to Dr. Deakin's question regarding the practicability and feasibility of using this type of treatment in your office, it can be said that this method of treatment is perhaps the most practical for use in a urologist's office. Of course, one must appreciate that extra space or special room is required to house such an instrument the treatment of which takes from three-quarters to one hour. If a urologist does not have the space, it would perhaps be better if he sent his patients to be treated elsewhere, providing he saw fit to recommend this type of therapy.

---

#### Dr. Max Thorek Honored

Dr. Max Thorek has been made an Honorary Member of the Surgical Society of the University of Sofia, Bulgaria.

---

#### Residencies In Physical Therapy

The recent announcement in the Journal of the American Medical Association that two residencies are available; namely, at Stanford University Hospitals at San Francisco, and the Michael Reese Hospital at Chicago, is an encouraging sign of the trend and increasing appreciation of physical therapy in hospital practice. This offers opportunity for those intending to more thoroughly orient themselves in this field and suggests that other institutions follow the example set before them.

## ELECTROCOAGULATION IN BRONCHOGENIC CONDITIONS \*

JOHN D. KERNAN, M.D.

NEW YORK

My attention was first called to the use of diathermy in the treatment of lesions of the trachea and bronchi by the necessity of devising adequate treatment for a patient with an adenoma of the left bronchus. This patient was a woman of thirty-one who at the time seen in 1927, had had recurring attacks of massive collapse of the left lung for six years. Bronchoscopic examination showed a rough vascular tumor just at the mouth of the upper lobe bronchus. This tumor, being quite vascular, probably had a tendency to swell whenever it became congested. This swelling of the tumor would cause it to block the main bronchus above the upper lobe bronchus, hence the massive collapse or atelectasis of the lung.

The specimen removed for biopsy was reported as being carcinoma. This made the prognosis seem rather bad. First attempts were made to remove the tumor with biting forceps. The resulting hemorrhage made it impossible to proceed with this method. Radon seeds were then inserted into the base of the tumor without appreciable effect. Electrocoagulation was then decided upon. This method proved successful; the woman being well today, nearly ten years after.

### Electrosurgical Electrodes for Pulmonary Lesions

As far as could be learned at the time this case was treated, little work had been done on lung lesions with diathermy through the bronchoscope. It was necessary to invent the proper instrument. The first model consisted of a long suction tube insulated by drawing over it a rubber dakinizing tube, and having through it a length of tonsil snare wire. The plan was to introduce this instrument through the bronchoscope, plug the wire into the growth and close the electric circuit by touching the outer end with the lead from the diathermy apparatus. You will see at once that this was a very crude instrument. In the first place, on account of the size of the suction tube and its covering of rubber, it was impossible visually to guide the tip of the wire into the growth. Under such circumstances one could not tell whether it was being applied to the lesion or to some normal part of the bronchial wall. That was a matter of guess work. Moreover, owing to the inability to see, one could not determine the effect of the current on the growth. The requirement was an applicator which could be introduced through the bronchoscope with accurate placing of the tip under direct observation to gauge the action of the coagulating current.

An improved applicator was finally devised. It is slender enough to be introduced through a supplementary tube at the side of the bronchoscope, completely out of the line of vision. The tip is bent in such a way as to bring it up into the lumen of the bronchoscope where it is well seen. This tip is like the bead-shaped tip of the front sight of a rifle. There are two reasons for this. A thin tip, which was tried, is difficult to see, so accurate placing is impossible. In the second place, a sharp thin tip is rather dangerous as it will more easily penetrate the bronchial wall producing hemorrhage or emphysema in the mediastinum.

\* Read at the Fifteenth Annual Session of the American Congress of Physical Therapy, New York, September 8, 1936.

### Technic of Operation

The patient is placed under local anesthesia. General anesthesia is to be avoided as it is important to preserve the cough. Even the local anesthesia at the site of the lesion is dangerous because that also suppresses cough and makes hemorrhage dangerous. Caution must be exercised in introducing any of the anesthetic solution into the bronchus of the other lung. A dispersive electrode is applied to the back. The active electrode is then passed through the channel in the wall of the bronchoscope and its slide of application tip placed against the lesion. It is very important to do all this with as little manipulation as possible because bleeding may be started making accurate treatment impossible. Let me emphasize this point. Just as soon as the lesion is accurately visualized through the bronchoscope, at once introduce the electrode and apply the current. A foot switch is much more controllable by the operator.

The strength of the current varies according to the size of the patient. The resistance to the current of a child of twelve is much less than that of a well developed adult. As a rule when the current is short circuited, the ammeter should show about one thousand to fifteen hundred milliamperes. The best way is to make the first application of the current tentative and judge by the effect on the lesion. In treating adenomas, I have found a rather strong current that produces an instant blanching at the tip of the electrode is best. Such a current is more controllable. It is important to avoid charring of the tissue and the production of smoke which might interfere with vision.

When the treatment is finished the lesion should show several small white coagulated areas, looking somewhat like a tonsil during an attack of follicular tonsillitis. A peculiar effect of the application of diathermy to adenomas, with the treatment of which I am most familiar is this, that even though the whole growth is not coagulated, its vitality is affected. A few weeks after treatment, the growth will be found to be much smaller than immediately after the treatment. Thus a tumor sufficiently large to block a main bronchus will have completely disappeared after three or four treatments, although at no time was it completely coagulated.

### Dangers of Electrosurgery in the Trachea and Bronchi

The first danger I encountered was over-coagulation. In a boy of fourteen in whom the lesion in his left lung was thoroughly coagulated with one of the old type applicators, without accurately visualizing the area treated, not only was the tumor destroyed but also some of the surrounding bronchial wall. When healing occurred, the bronchus was much narrowed by scar tissue. As you know, on many of these cases of obstruction of the bronchus, there is an infected bronchiectasis beyond the obstruction. The obstruction by scar tissue in this case was such that ultimately a lobectomy had to be done. The lobe was found completely destroyed by the supuration. The growth had been completely removed. This was one of the cases which taught me the necessity of accurate vision. Another danger is penetration of the wall of the bronchus with the possible opening of a blood vessel or the mediastinum. I have not seen either of these accidents in connection with the treatment of adenomas. To avoid the danger of penetration, it is important not to remove tumors with forceps and then apply diathermy to their point of origin but to coagulate them *in situ*. No doubt the tumor protects the normal wall from destruction by the current, acting somewhat as does the screen in roentgen therapy. Moreover, removal of the tumor starts bleeding which makes accurate placing of the electrode

impossible at that sitting anyway. In addition, it is more difficult to see an area flat on the bronchial wall than a tumor projecting into the lumen. Thus neither the placing of the tip of the electrode nor the effect of the current can be seen once the tumor is removed.

It is essential to deliver current to the base of the tumor. It must be remembered that in many cases of adenomas there is neoplastic tissue outside of the lumen and wall as well as inside. In order to effect a cure it is necessary to reach this outside part. There is some experimental evidence on this point of the tumor protecting the bronchial wall. In dogs it has been found that a piece of meat simulating a tumor placed against the tracheal wall can safely be destroyed without injury to the trachea. On the other hand, if the current is applied directly to the wall, unless the greatest care is exercised, penetration will result followed by death at once or in a few days.

Another important point is the use of a rather large electrode tip. In the only serious accident I have seen resulting from the use of diathermy in the bronchi, two things combined to produce the unfortunate result. The patient was a young woman with an obstructing tuberculous tumor in the right main bronchus. This tumor had been successfully destroyed leaving a flat ulcer which was rapidly healing. The surface of this ulcer was coagulated with a thin tip. The result was too deep penetration and an uncontrollable hemorrhage.

#### Indications and Results

Now as to the lesions to be treated by diathermy and the results. The most successful cases have been adenomas. These are vascular tumors which in some instances closely resemble carcinomas, even to the extent that they are called carcinomas or adeno-carcinomas by the most competent pathologists. These tumors rapidly yield to the use of diathermy. Although the first cases treated by me required many bronchoscopes, the most recent case, in which the improved instruments were employed, have been cured by three or four treatments. At the present time, these treatments are given every two weeks. Perhaps a longer interval would be preferable. I have an idea that vascular growths are more amendable to diathermy treatment than those not vascular. In any event, such tumors as fibromas and lipomas which are occasionally encountered in the bronchi can be successfully removed by forceps or snare and there is no occasion to use diathermy on them. One very firm tumor on which I completely failed with diathermy was subsequently removed with a snare. It turned out to be a chondroma.

The successful cases of adenoma have been small tumors with no great extension outside the wall of the bronchus. One case of adenoma which had existed in a patient for forty years failed to yield to bronchoscopy and was not even benefited. A pneumonectomy was performed on this patient. In one case treated by me, the adenoma in the bronchus had so invaded the lung tissue that it was not possible to destroy it through the bronchoscope. In this case, the region was attached from the outside through thoracotomy wound. Ribs were resected. A large part of the growth was removed by the cutting current and the remainder destroyed by coagulation. This required a number of sittings but the patient ultimately made a good recovery.

I have had no success with malignant tumors. Theoretically early malignant growths should yield to electrosurgical destruction. In the majority of carcinomas, surgery is out of the question because of the advanced stage of the growths. Roentgen therapy is the only recourse.

I have had one tracheal carcinoma in which coagulation was an aid.



This was in a woman in whom a malignant growth of the thyroid gland had been removed. There was a local recurrence and a rupture into the trachea. The growth in the trachea had grown so large as to obstruct breathing. By means of diathermy it was found possible to remove sufficient of the intratracheal growth to relieve the breathing. X-ray treatment and repeated coagulation resulted in complete disappearance of the growth.

Another class of tumors which are amenable to coagulation are tuberculous. It occurs too often that a pulmonary tuberculosis will invade a large bronchus and produce there a tumor which obstructs the lumen. This results in collapse of the lobe or even the whole lung and retention of secretion. These tumors are treated like the adenomas. With more careful visualization they are coagulated a little at a time at repeated bronchoscopies. It will be found easy to reduce the size of the tumor and to restore drainage. In these cases, however, even when the tumor has disappeared, ulceration will remain. The ulceration requires most persistent treatment which is difficult and dangerous. Hemorrhage and perforation threaten as in the case I have quoted. Visualization should be as perfect as possible. A large tipped applicator should be used to distribute the current widely. The anesthesia should be restricted to the area treated and the cough reflex preserved. Should hemorrhage occur, a bronchoscope in place and a large suction tube to remove the blood will help prevent flooding the lungs with blood.

At best tuberculous cases are none too successful. Even when healing occurs, a scar stricture is likely to be produced. This results in the very obstruction for which the tumor was originally attacked. Another tuberculous lesion for which diathermy is used is ulceration without tumor formation. It is possible to heal these at times though the result is always scar tissue. It may be said, however, that scar tissue even where it strictures the bronchus is preferable to an open ulceration which may be the source of hemorrhage and irritation, cough and secretion. As the healing of a tuberculous ulceration will usually relieve symptoms such as cough and haemoptysis, it is always worth while attempting it. Moreover, it must be remembered that an unhealed ulceration is liable to increase in size and become continually more dangerous.

### Summary and Conclusions

In preparing for coagulation of a bronchial tumor, everything must be set and ready. Once the bronchoscope is in place, there must be no delay. The first look is always the best and offers the best chance for placing the diathermy tip correctly.

In the course of my paper I have taken up first the instruments used in these treatments, but only the bronchoscopic instruments. I have assumed the presence of a proper diathermy machine. It will be noted that I have spoken only of use of the biterminal current since I have never used the monoterminal.

Local anesthesia is used; a foot switch and a current powerful enough to at once produce a small area of coagulation. A number of such applications are made, without endeavoring to destroy the whole growth. Certain types of lesions are amenable to diathermy through the bronchoscope. Caution must be used to avoid perforation of the bronchial wall and excessive hemorrhage.

### Discussion

**Dr. M. H. Cottle** (Chicago): It is important that one understand the technic of electrocoagulation before attempting it through a bronchoscope or otherwise. I believe the monoterminal current is unsuited to the desired effects of electro-surgical destruction of tissue. This current is not easily controlled, nor can it be employed without some hazard to the patient. This is especially true when using it endoscopically.

There should be no difficulty in controlling immediate hemorrhage from electrocoagulation by adjusting the current and fulgurating the bleeding vessels. Superficial effects are possible even with the biterminal current but it must be properly applied.

I have utilized electrocoagulation as an aid in tissue destruction when performing laryngo-fissure. I have also performed a ventricular cordectomy with surgical diathermy. Adenoma in the bronchus should lend itself quite amenable to diathermic destruction.

One should mention that with electro-surgery shock is minimized even though the operation may be a prolonged one.

Dr. Kernan's work should inspire other workers to help in perfecting apparatus and technic.

**Dr. H. H. Forbes** (New York): Bronchoscopy is a subject every otolaryngologist is interested in at present. Marvelous results have been and are being obtained not only in diagnosis, but also in therapy, through the bronchoscope, as was brought out in the essayist's paper.

As far as hemorrhage in these cases is concerned, I quite agree with Dr. Kernan that it can be controlled to a great extent. Just why Dr. Kernan could not control the one in the case of the tuberculous lesion, I do not know. Perhaps if he saw the same case again and used fulguration instead of coagulation, he might have had better success.

We have spoken of diagnosis and the benefit to be derived from the use of diathermy. I favor simplification of technic. If the monoterminal current will serve the purpose, it should be used.

When making the biopsy, which Dr. Kernan always does, I cannot see any objection to applying the coagulating current. Whatever the growth may be; if it is malignant, we have done no harm. If it is an adenocarcinoma or simple adenoma, we have gotten in a treatment without extra effort, on the part of the patient, to our primary treatment.

I wonder if I might digress a little bit on this electricity, just for a second. You may have read Dr. Howard Kelly's book. Howard Kelly, in speaking of electricity—and I am rather an enthusiast on the subject in my nose and throat work—speaks of electrical surgery. He says, "Electro-surgery opens up a vista," and it certainly has opened up a vista with our bronchoscope as we have seen today.

He says, "We believe it is destined in no small measure to replace the scalpel,

ligature and hand contacts with wounds, as well as to pare down the number of those listed as inoperable cases by the skilled surgeon."

I ask where could one find a better example of this quotation than the work presented to us today by Dr. Kernan?

**Dr. Rudolph Kramer** (New York): My first experience in the use of diathermy with the bronchoscope was about ten or eleven years ago. When you consider, however, that in the average practice during the year there are perhaps only fifty to one hundred cases of tumor that come in for bronchoscopic observation, it will take a long time before an extensive experience can be had in the different varieties of tumors. In a series of tumors (I have had about 475) approximately 95 per cent was carcinoma. These are practically subject to our observation and not our therapy.

In this whole series of carcinoma, I think I have seen one case that was less than a centimeter in diameter and limited to the surface. If I see another case of that sort, I will turn it over to the surgeon for extirpation, to give the patient his best chance, but beyond that our efforts as far as carcinoma are concerned, are purely palliative. However, there are other rarer lesions that occur in the bronchus, tracheobronchial tree, and, as in everything else, we all have our own ways of doing things.

We may have stumbled on a technic by accident or thought, and we have tried it out and fooled around with it a bit and finally got what was a fairly satisfactory method of use. It is only by comparison of the various technics that one can decide eventually what is the best method.

I have seen a great number of cases of tuberculosis of the tracheobronchial tree. I have rarely seen any cases in which I cared to interfere actively, because of the generalized disease in the lung. However, that does not mean that others may not have seen several hundred other cases and found twenty or fifty that were eminently suitable. It takes a very large number of cases to appreciate the indications. The one thing I have learned from Dr. Kernan's presentation is that there are tuberculous cases that are amenable to treatment by diathermy through the bronchoscope.

As far as malignant conditions, I have had only one case, a basal cell carcinoma in the bronchus, which I treated with diathermy. It is now two years. The patient is clinically and physically in good health.

The question of adenoma and its treatment is rather interesting. I have seen twenty-seven cases now, eleven of which I treated with diathermy as an adjuvant, and I say "adjuvant" advisedly, because my technic differs considerably from that of Dr. Kernan's. I think in part it is due to the fact we use different types of instruments. I use the proximally lighted bronchoscope and I guess most of you

use the distally lighted instrument. It makes a great deal of difference in the technic.

If we go back to the pathology of these tumors, 90 per cent are pedunculated, benign. The other ten per cent are not, and invade the bronchial wall and spread externally. It is a peculiar characteristic which has been mentioned by both Dr. Kernan and Dr. Cottle, that these tumors bleed very readily. They very often have severe spontaneous hemorrhages, and if any of you have had the experience of putting a bronchoscope down in a patient with this type of tumor, and trying to clear the lumen with a suction tip, you experienced severe hemorrhage making it necessary to desist for the day. It is also an interesting thing that if you remove most of the tumor down to the pedicle, the bleeding stops.

I use a small, fine-pointed electrode, such as one would use to pick off a little lymphoid nodule in the tonsillar fossa or to coagulate a spot in the nose. The diameter with the rubber covering is not more than two millimeters, the point is fine, completely insulated up to about  $\frac{3}{4}$  inch from the tip, and vision is not distorted or disturbed.

Again, I am speaking only of the proximally lighted bronchoscope. Whether the same vision obtains with the distally lighted instrument, I cannot say, but the application of the current is right into the tip of the pedicle, instantaneous coagulation, and that is all there is to it.

In other words, at the first bronchoscopy, a specimen must be removed for diagnosis. There is no accurate way of making a diagnosis without biopsy. You need as much as possible for the pathologist as you can obtain. At the first bronchoscopy you proceed with as much of the tumor as you can do. This is repeated in a week. If there is any more left it is removed; if not, just a pedicle that is coagulated, and that is the end of it. Further bronchoscopy is done a week or two later to determine whether the bronchus is free. It is very important to get rid of the tumor as soon as possible.

**Dr. M. J. Mandelbaum** (New York): Dr. Kernan, strangely, without knowing anything about my attempt to use the uniterminal current, mentioned what he thought might be possible to use in that direction. Dr. Cottle, in his work, came to the conclusion, at least up to the present time, that it might be unsafe. Well, it was unsafe and it is unsafe under certain conditions, just like any other medium is, and can be unsafe if you haven't the proper medium through which to transmit the current.

I quite agree with Dr. Kramer — in our experience, at least, in the use of the uniterminal current with the distally lighted instrument. I also agree with Dr. Cottle that it is rather a dangerous procedure.

With the distally lighted instrument and a peculiarly constructed uniterminal electrode, which was devised with the help of an electrical engineer, we can use the monoterminial current safely.

My experience has been mainly with small bleeding surfaces, several of which were tuberculous ulcerations, one in the esophagus and the others in the trachea and large bronchi.

There is no question that, as Dr. Kernan mentioned, the beneficial effect of the high frequency current is on the surface of the tumor. Frequently the influence is much deeper than one suspects or desires, and one must therefore be careful in applying the current when only a superficial effect is called for, as in the case of surface bleeding.

**Dr. Kernan** (closing): Dr. Cottle answered my question about the monoterminial current. Along comes Dr. Mandelbaum and refutes our claims. This problem will eventually be solved when more work is done in this field.

I could talk at length about the treatment of adenomas, whether to take them off first or not. You cannot do it with distally lighted instruments, that is all there is to it. It is a messy business, and just as soon as you start hemorrhage, you cannot see anything. If you are using proximally lighted tubes, you may be able to do it.

I get along very nicely with the coagulating current. You see your tumor, coagulate it, and that is probably the end of the hemorrhage. The next time you go in, it is about half the size and very much less vascular. The reason I am afraid of taking away the tumor is just that point. Of course, this is the way I do it. You have a bronchial wall and the tumor and you put the diathermy in, and the current goes through the tumor and shrinks it. After a while you get rid of the growth. If you have just the base of it and put the electrode in, then the current is going out, I never could make up my mind as to what it was doing outside the bronchial wall. It is pretty hard to tell whether you are running into danger or not.

Dr. Kramer says you are not, and I can assure you all from what I know of him, he is probably right about it. There is one thing about it — I had one that had a pedicle that hung out into the main bronchus. The application of the current destroyed it so that after a while when we were able to get a look up into the bronchus, there was a perfectly smooth wall. The application of the current to even a distant part of the tumor will often destroy it in toto.

Treatment of adenomas is very interesting. Dr. Kramer has had more experience in this than I have had. I may eventually go back to the proximally lighted instrument which I gave up in 1914.

## RESTORATION OF MUSCLE BALANCE IN THE TREATMENT OF SCIATIC PAIN \*

R. E. LENHARD, M.D.

and

H. O. KENDALL

BALTIMORE

During the past two years, there have appeared several papers on sciatic pain which merit a brief review in connection with our presentation. Heyman<sup>1</sup> stated that patients were relieved of sciatica the day following a sacroiliac fusion, which shows the relief was not due to the fusion. He performed a simple stripping of the gluteal muscles and fascia from the posterior third of the ilium to the top of the gluteal notch. His results in two cases were excellent in the sense of immediate relief of pain. One patient who was under observation for one and one-half years and one seen after six years remained well. He admitted the rationale of the procedure was not clear to him, but the success of the operation deserved consideration.

Freiberg and Vinke,<sup>2</sup> felt that the piriformis muscle being so intimately in contact with the sciatic nerve is a likely factor in causing sciatic pain, owing to inflammation and spasm of the muscle with resultant irritation of the nerve. A number of cases were relieved by cutting the piriformis from its attachment to the greater trochanter. The relief was immediate, but some of them had recurrence after a few weeks. It was interesting, however, that the relief was prompt in all cases and that many of the patients remained well.

Ober<sup>3</sup> reported immediate relief from pain in most of the patients in whom he divided the fascia lata over the gluteus maximus and the tensor muscles. He found in all his cases a tight fascia lata, seen at operation to be thickened, and in some instances showing chronic inflammation. He also mentioned that Roberts, of New York, had been doing for some years the same type of fascial stripping described by Heyman, and with the same good results.

All these authors, while admitting sciatica may be caused by articular lesions of the lumbosacral and sacroiliac, feel that the etiology may be, also, extra-articular.

About twenty years ago, Bennett,<sup>4</sup> of Baltimore, operated upon a number of patients with sciatica, recognized the painful point over the buttocks and diagnosed it as gluteal bursitis. He made an exploration to remove the bursa which, however, was never found, but about 50 per cent of the patients were relieved of their sciatica. The operation was abandoned because no pathologic lesion could be demonstrated, and this work was never published.

For the past few years we have been much interested to find that the examination of patients with persistent sciatica gives a picture of muscle weakness, imbalance, and contracture that may help to explain the pain when the radiographs are negative, suggesting a diagnosis of chronic lumbosacral or sacroiliac strain.

Almost without exception the patients with chronic sciatica have a slight adduction and internal rotation of the affected hip. This may be associated

\* Read at the Fifteenth Annual Session of the American Congress of Physical Therapy, New York City, September 8, 1936.

with a tilt of the lumbar spine, although in a great many cases the lumbar spine appears straight. It is sometimes necessary to have the patient stand for a minute to tire the weak muscles sufficiently to demonstrate the asymmetry of the lower back and hips. One finds the posterior superior spine and the crest of the ilium slightly higher on the side of the sciatica. There is usually pronation of the feet, more on the affected side, and an increase in the normal lumbar lordosis. With the pelvis tilted forward and the thigh rotated internally, the fascia lata becomes contracted. If these findings be true, one can see that there is tension on the gluteal muscles, the abductors of the hip, the piriformis, which is an external rotator of the hip, and on the fascia lata that extends over the gluteus maximus. A weakness of the gluteus medius on the side of the sciatica can be demonstrated in all such cases. While the patient lies on the unaffected side with the lumbar spine straight, the affected leg is extended, abducted, slightly rotated externally and brought into slight hyperextension. When the leg is held in this position against resistance, the gluteus medius, an abductor of the hip, is found to be weaker than the gluteus medius of the other hip, when the corresponding test is done on that side.

### Treatment

Proceeding on the basis of these findings, the treatment consists of relieving the pelveo-femoral muscles from tension, strengthening the weak gluteus medius, and by the usual methods of exercising postural balance to the lumbar spine. Radiant heat to the lumbar spine, massage, and stretching of the lumbar muscles are followed by exercises for the abdominal muscles, gluteals, hamstrings, and gluteus medius. By a lift, which may vary from  $\frac{1}{4}$  to  $\frac{7}{8}$  of an inch, on the heel of the shoe of the unaffected leg, we are able to shift the pelvis and abduct the affected hip. By a slight elevation on the inner border of the heel and sole of the shoe of the affected leg, we are able to rotate it externally. This elevation may vary from  $\frac{1}{16}$  to  $\frac{3}{16}$  of an inch. By exercise, we are able to strengthen the gluteus medius and abdominal muscles in order to restore muscle strength and balance to the hip and lumbosacral areas. By the shoe lifts, we have been able to demonstrate immediate relief in some cases while the patient is standing during the period of the examination, and by the exercise program to establish relief that has been maintained. This outline of treatment apparently obtains relief for patients by releasing tension from the region of the buttock.

At this time, we are not prepared to present statistics of all the cases treated, of which there have been about fifty. The essential facts of a few may suffice for illustration.

### Case Reports

A woman, aged 45, developed right sciatic pain radiating to the foot, six months before she was seen. She had no history of injury. An x-ray revealed no arthritis of her lumbar spine. She showed a typical picture of an adduction deformity of her right hip, with slight internal rotation and bilateral pronation of the feet. She was tender over the right sacroiliac and down over the right buttock, and had a positive straight leg raising test on the right side. Her previous treatment had been internal medication with rest, but her condition had become worse, so that during the few weeks previous to her examination, she had been forced to take aspirin every two hours to obtain some relief. She had a  $\frac{1}{4}$  of an inch lift placed upon the heel of the left shoe and a  $\frac{1}{8}$  of an inch elevation of the inner border of the right sole and heel. She was markedly improved after three treatments of infra-red heat to her lumbar spine, massage of the lumbar muscles, exercises for her abdominal musculature and the gluteus medius. Her pain was entirely cleared up after three weeks of treatment.



A man, aged 64, a gardener, fell and struck his left buttock on the wheel of a lawn mower. He developed local pain with gradual radiation down the course of the sciatic nerve to the foot. He became incapacitated to the point where he could do no work but was able to obtain some comfort from complete rest. He was seen two years later, at which time the x-rays showed a fracture of the superior rim of the acetabulum which had not united. Since his local tenderness was directly over this region of fracture, it was felt that the injury was causing enough irritation to be responsible for his sciatic pain. He was operated upon and through a curved incision below the trochanter the hip was approached by removing the trochanter and dissecting upward the gluteus medius muscle. The loose fragment of bone was removed. Following the operation the patient's pain was relieved for four months, then gradually recurred, and finally prevented him from walking, and even caused some discomfort through the night. Examination at that time revealed marked weakness of his gluteus medius muscles with a marked adduction of the left hip. His treatment consisted of a  $\frac{7}{8}$  of an inch elevation of the right heel and  $\frac{3}{16}$  of an inch elevation on the inner border of the left shoe. Local heat and massage of his lumbar spine, with exercises for his abdominal muscles and left gluteus medius were administered. He gradually improved and after five months was able to do a full day's work and had only slight discomfort at night. He had no recurrence of his sciatic pain during a year of observation.

A woman, aged 35, who weighed 175 pounds, developed slowly a right sciatic pain seven years previous to our examination. Four years after the onset of pain, she had a fusion of her right sacroiliac, which relieved her for a period of four months. Slowly the pain recurred and persisted during the next three years. She showed the typical adduction and internal rotation of the right hip. She had a gradual elevation of the left heel from  $\frac{1}{4}$  to  $\frac{5}{8}$  of an inch, and  $\frac{1}{8}$  of an inch elevation on the inner border of the right shoe. Following the local heat and massage to her lumbar spine, abdominal exercises, and exercises for her gluteus medius her pain gradually improved over a period of three months to the point where it became virtually negligible. The patient is still under treatment.

We are unable to say that the adduction and internal rotation of the hip are primary factors in causing sciatic pain. It is possible that the imbalance of the hip is secondary to a position assumed during the acute attack. On the other hand, we do believe that the asymmetry of the pelvis can be caused by flat feet or poor posture of the lumbar spine, with anterior tilting of the pelvis.

### Conclusion

In a short preliminary paper, we wish to note the findings of muscle imbalance that are consistently found in a series of cases of sciatic pain. The imbalance apparently puts a tension on the sciatic nerve that can be relieved by appropriate conservative treatment, consisting of physical therapy, aided by shoe lifts to correct the pelvic tilt.

### References

1. Heyman, Clarence: Thoughts on the Relief of Sciatic Pain, *J. Bone & Joint Surg.* **16**:889 (Oct.) 1934.
2. Freiberg, A., and Vinke, T. H.: Sciatica and Sacroiliac Joint, *J. Bone & Joint Surg.* **16**:121 (Jan.) 1934.
3. Ober, Frank: The Role of the Iliotibial Band and Fascia Lata as a Factor in the Causation of Low Back Disabilities and Sciatica, *J. Bone & Joint Surg.* **18**:105 (Jan.) 1936.
4. Bennett, G. E.: Personal Communication.

## ARCHIVES of PHYSICAL THERAPY

OFFICIAL PUBLICATION AMERICAN CONGRESS OF PHYSICAL THERAPY

Editor: DISRAELI KOBAK, M.D., CHICAGO

### EDITORIAL BOARD

**Medicine**—WILLIAM BIERMAN, M.D., *New York*; JOHN D. CURRENCE, M.D., *New York*; J. C. ELSOM, M.D., *Madison, Wis.*; F. H. EWER-HARDT, M.D., *St. Louis*; JOHN SEVERY HIBBEN, M.D., *Pasadena*; FRANK H. KRUSEN, M.D., *Rochester, Minn.*; EDGAR MAYER, M.D., *Saranac Lake*; MARY ARNOLD SNOW, M.D., *New York*; NORMAN E. TITUS, M.D., *New York*; JAMES WILTSIE, M.D., *Binghamton, N. Y.*; HEINRICH WOLF, M.D., *New York*.

**Surgery**—GUSTAVUS M. BLECH, M.D., *Chicago*; JOHN S. COULTER, M.D., *Chicago*; GUSTAV KOLISCHER, M.D., *Chicago*; WM. H. SCHMIDT, M.D., *Philadelphia*; F. H. WALKE, M.D., *Shreveport, La.*; GRANT E. WARD, M.D., *Baltimore*.

**Eye, Ear, Nose and Throat**—A. R. HOLLENDER, M.D., *Chicago*; O. B. NUGENT, M.D., *Chicago*; F. L. WAHRER, M.D., *Marshalltown, Ia.*

**X-Ray and Radium**—HARRY H. BOWING, M.D., *Rochester, Minn.*; R. W. FOUTS, M.D., *Omaha*; R. E. FRICKE, M.D., *Rochester, Minn.*; IRA I. KAPLAN, M.D., *New York*; A. F. TYLER, M.D., *Omaha*.

**Biophysics**—ALBERT BACHEM, Ph.D., *Chicago*.

**Biochemistry and Nutrition**—VICTOR E. LEVINE, Ph.D., M.D., *Omaha*.

**Foreign Collaborators**—OSCAR BERNHARD, M.D., *St. Moritz*; H. BORDIER, M.D., *Lyons*; ELKIN P. CUMBERBATCH, M.A., M.B., (Oxon), M.R.C.P., *London*; A. R. FRIEL, M.A., M.D., (Univ. Dub.), F.R.C.S.I., *London*; SIR HENRY GATVAIN, M.D., M.Ch., *Alton, Eng.*; F. HOWARD HUMPHRIES, M.D., (Brux.), F.R.C.P., (Edin.), D.M.R. and E. (Camb.), MOREL KAHN, M.D., *Paris*; JOSEF KOWARSCHIK, M.D., *Vienna*; FRANZ NAGELSCHMIDT, M.D., *Mann-sonne, M.D., Copenhagen*; ALBERT E. STEIN, *chester, Eng.*; A. ROLLIER, M.D., *Leysin*; CARL M.D., *Wiesbaden*.

## EDITORIALS

### THE ARCHIVES OF PHYSICAL THERAPY — A NEW TITLE

The change of the past name of the ARCHIVES to its present abridged appellation was dictated by the progressive policy that "name and fame" must be in accord with its aims and objective in its special sphere of literary activity. In its capacity as official organ of the American Congress of Physical Therapy this periodical has in the past played a role of acknowledged educational importance through its influence on contemporary medicine. During its eighteen years of life it has reflected the scientific progress in physical medicine by an organized program of dissemination of authoritative and original contributions of both a timely and critical character. That this has gradually become restricted to studies of physical procedures and so recognized by contributors of national and international reputation, has largely been the reason for the change to the new designation of the ARCHIVES as the medium for scientific expression on this important branch of modern medicine.

It goes without saying that serious consideration has been given to this problem and was arrived at only after deliberations by the entire official body of the Congress. In the past when representative opinion pointed out that the trend of the Congress was gradually centralizing its interest toward fields broader than the therapeutics associated with radiation, the official publication changed its name from the *Journal of Radiology and Physical Therapy*, to that of the ARCHIVES OF PHYSICAL THERAPY, X-RAY, RADIUM. Later, when the Congress merged with the American Physical Therapy Association and took over their publication, it again modified the title of its journal by incorporating the latter under the heading as a sub-title (*Physical Therapeutics*). Thus in the past two decades a flexible policy facilitated adaptability to the changing social order, and a literary program

that rigidly and critically surveyed the scientific progress in the domain of physical therapeutics.

Under its new title the ARCHIVES is now, as has been the Congress for some time past, dedicated to an educational program restricted to physical therapy. This will be sufficiently broad in scope to render special service to scientific medicine and surgery by supplementary contributions to the allied sciences. In keeping with such a contemplated project future issues of the ARCHIVES will carry in addition to the annual transactions of the Congress the most authentic reports of original work from foreign sources on biophysical, and physiologic and clinical topics related to physical medicine. Its broad aims will not overlook the splendid and increasing research work which is being carried out in the laboratories and clinics of American institutions. Indeed, the formulation of such a project was already well on its way even before a unanimous decision was arrived at for the new designation of the ARCHIVES. This was dictated by the demands that its information should be world-wide and that it should voice the opinions of the most advanced workers and thinkers in a fashion consistent with the intellectual democracy of science. The present issue initiates a new era which will attempt to reflect, analyze and critically evaluate the latest facts, theories and philosophies on the developments in physical therapy. The term "philosophies" is used advisedly because it implies the highest unification of organized knowledge. It is because of such an objective that the American Congress and its official publication have been accorded universal recognition and encouragement to carry its message to the leaders, students and practitioners of classical medicine and surgery.

---

#### SHORT WAVE DIATHERMY IN ENDOCRINE DISTURBANCES

The management of a large number of endocrine disturbances is still empiric in nature. The mere fact that pluriglandular products are daily prescribed for grave affections of undoubted endocrine origin is a reproach to modern scientific medicine. In this respect the groping for remedial measures is not one whit different from the old time shot-gun prescription concocted on the assumption that possibly one or two of the many ingredients may produce alleviation if not a cure. Modern research has placed pharmacotherapy on a sound scientific footing and the time has arrived when the same exaction must be demanded of opotherapy. How little of that desideratum has been realized is common knowledge. Nor does it bring credit to present day endocrinology when one of its foremost representatives is forced to state, "until fundamental knowledge is secure the ascription of endocrine causation to a given puzzling phenomena is but a mark of pseudo-erudition" (Hoskins<sup>1</sup>). It is therefore heartening that a decided step of unquestioned value has been made in the direction of recognizing the relation of certain glandular dysfunctions to certain diseases which up to recently have not been considered to have any relation to the endocrine system, and the therapeutic possibility and limitation of exogenous substitution products.

To us it is particularly remarkable that the employment of short wave radiation should be one of the means of demonstrating the true role of such glands as the pituitary and the thyroid as exercising a definite control on organs and viscera essential for the maintenance of life. While the function of the female genital apparatus has been well understood, recent research has overthrown some concepts and furthermore has established a definite relationship with the hypophysis and the thyroid glands. Samuels<sup>2</sup>, whose original and thought provoking contribution appeared in the last and

is concluded in this issue, clearly shows both by experiment and clinical observations that by a properly adjusted combination of short wave and glandular therapy results are obtained in conditions which are generally admitted to be resistant to any form of therapy. Apart from this his methods of research definitely establish that the concept that normal women undergo ovulation once a month is wholly erroneous, and that many women ovulate two or even three times per month, cycles which no doubt will be denied by all gynecologists who have not familiarized themselves with the cycloscopic method devised by him. It is admirable that in spite of considerable originality in Samuels' investigations coupled with the fact that he has devised new instruments of precision, he has not failed to accord credit to the late French investigator, Dausset,<sup>3</sup> after whose death he has not only perfected Dausset's methods but has expanded them to a diagnostic procedure, the possibilities of which cannot now be fully realized.

Without here entering into the detailed technical steps described by Samuels, it must suffice here to stress a factor which at this time has aroused considerable interest and agitation both here and abroad, albeit from an entirely different point of view. It will be recalled that the labors of Liebesny, Weissenberg, Dalton and the modern Russian School personified by Tatarinov, Frankel, and others, with respect to the physiologic and clinical effectiveness of short wave radiation at a dosage so minimal as to preclude any subjective thermic sensation, have been negated by those who recognize only the element of heat as the effective characteristic of short wave diathermy. Independently and in all probability without knowledge of these labors with so-called athermic short wave radiation, Samuels has shown the importance and effectiveness of low dosage radiation especially when directed to the hypophysis and the diencephalon and mesencephalon. Thus he has confirmed by actual clinical work the correctness of the claims made for low dosage short wave therapy. Accordingly Samuels' contribution opens up a new vista for combined short wave radiation and opotherapy which may yet revolutionize the management of affections more or less influenced by the central and autonomic nervous systems.

#### References

1. Hoskins: Quoted by William R. Houston, *The Art of Treatment*, New York, The Macmillan Co., 1936, p. 267.
2. Samuels, J.: Short Wave Treatment of the Endocrine System, Diencephalon and Mesencephalon, *Arch. Phys. Therap.*, Part I, 18:741 (Dec.) 1937; Part II, 19:13 (Jan.) 1938.
3. Dausset, H.: Ce que nous savons actuellement de l'action thérapeutique des ondes courtes, *Gaz. méd. de France (supp. Radiol.)*, pp. 67, May 1, 1933.

---

#### ELECTROSURGERY AND BRONCHOSCOPY

The successful use of electrosurgical procedures in otolaryngologic practice theoretically suggested their applicability to some of the less accessible regions for removal of certain neoplasms located within the bronchial tree. Since then theory has become a fact because experience has definitely established the value of electrocoagulation through the bronchoscope in a relatively large number of cases. Satisfactory results have been reported by several workers, differences of opinion existing only in regard to proper instrumentation. It was reasonable that differences should have manifested themselves, since no method has ever become perfected or standardized until suitable apparatus had been devised. Individual requirements and technic frequently call for variations in the construction of equipment,

such modifications being often as not rejected by other operators. In the end, however, a more or less standardized instrumentarium is generally accepted. This should be the end result as regards equipment for electrosurgery through the bronchoscope.

Kernan<sup>1</sup> has performed numerous electrosurgical operations through endoscopic approach. In his opinion the development of proper instruments had much to do with the success he has attained. He believes, however, that the indications and restrictions are now pretty well defined and that more workers should utilize electrosurgery through the bronchoscope. Emphasis is laid on the fact that a thorough understanding of the fundamentals of electrosurgery must precede its application in this as in other fields.

Up to fifteen years ago electrosurgery had a comparatively few proponents. General surgeons and specialists were slow to appreciate its superiority over the scalpel for the management of neoplastic disease. When, however, its indications were extended to brain surgery and its superiority demonstrated also for other grave pathologic processes, surgeons generally began to avail themselves of this newer and improved method.

The time has come when electrosurgery must be provided for in the armamentarium of every progressive surgeon and specialist. There are obvious indications for which employment of a certain therapeutic procedure must be superseded by the application of another because of anticipated favorable and superior end results.

#### Reference

1. Kernan, John D.: Electrocoagulation in Bronchogenic Conditions, Arch. Phys. Therap. 19:38 (Jan.) 1938.

---

#### Approved Schools for Physical Therapy Technicians

The cooperation of the Council on Physical Therapy, the American Congress of Physical Therapy and the American Physiotherapy Association was secured in determining minimum educational requirements for physical therapy technicians. "Essentials of an Acceptable School for Physical Therapy Technicians" were adopted by the Council on Medical Education and Hospitals and passed by the House of Delegates of the American Medical Association at the Kansas City meeting, May 9, 1936, as a result of the resolution introduced by Dr. C. B. Reed of Illinois. The first list of approved schools appeared in *The Journal*, Aug. 29, 1936, and the schools listed here represent the first revision.

As for other types of medical assistants, there exist many commercial schools for physical therapy technicians throughout the country. Although they are self-styled as schools of physical therapy, instruction given in courses of this type consists principally of concentrated massage training. Extensive advertising is used to secure students who are not aware that standards and a registry exist and that short courses are not as a general rule considered acceptable to hospitals and clinics employing technicians. Naturally, such schools are primarily interested in revenues and as a rule do not adhere to standard requirements for admission and curriculum. Students turned out by commercial schools find their

field of employment limited to massage establishments, clubs, gymnasiums, and so on; positions as assistants in hospital physical therapy departments or with members of the medical profession are virtually closed to them.

It has become increasingly apparent that many trained as "physical therapy technicians" in commercial schools infringe on medical practice and too often are not prosecuted. Those trained in acceptable schools become thoroughly imbued with the necessity of working under the supervision of a qualified physician at all times and thus they become bona fide technicians.

The Council's essentials have been prepared with the purpose of designating acceptable basic courses covering all the more important phases of physical therapy. The essentials were printed in *The Journal*, Aug. 29, 1936, and may be secured through the office of the Council. Additional schools will be considered on application and placed on the list when they are found to comply with the requirements.

The American Registry of Physical Therapy Technicians, sponsored by the American Congress of Physical Therapy, accepts for examination graduates of schools approved by the Council on Medical Education and Hospitals. Information regarding the Registry may be secured through Miss Marion G. Smith, registrar, 30 North Michigan Avenue, Chicago.—[J. A. M. A. 109:708 (Aug. 28) 1937.]



## THE STUDENT'S LIBRARY

DIATHERMY. INCLUDING DIATHERMOTHERAPY AND OTHER FORMS OF MEDICAL AND SURGICAL ELECTROTHERMIC TREATMENT. By *Elkin P. Cumberbatch*, M.A., B.M. (Oxon.), D.M.R.E. (Camb.), F.R.C.P. Medical Officer in Charge of Electrical Department and Lecturer on Medical Electricity, St. Bartholomew's Hospital. *With nine Collaborators*. Third Edition. Cloth. Pp. 576 with 166 illustrations. Price, \$6.00. Baltimore: William Wood and Company, 1937.

Cumberbatch's conservative evaluation of the clinical and surgical uses of diathermy has come to be regarded as one of the most reliable expositions because he has attempted to reduce his conclusions to facts of proven value. The third edition has been materially enlarged and benefited by careful revision, permitting the introduction of a number of new topics on some of the older and important problems related to conventional diathermy as well as that which concerns with the latest trend in short wave therapy. As compared to the size of the previous volume, the present work has reached the bulk where girth control should be a desideratum of the future, due to an increase of 340 pages over its predecessor. So far as benefits by revision, one notes that the author has introduced as associates in his latest labors the work of nine new contributors, each selected for his special experience in his chosen field. Thus with the exception of one item, which will be considered below, the present publication assumes a balance that rounds out the discussion of high frequency therapy for medical and surgical purposes seldom surpassed in the English language. The subject matter is divided into three large sections, and these into 38 chapters and a well organized index. Its scope includes discussions on the historic background of high frequency therapy in medicine and its physical nature and action, and provides a detailed survey of medical and surgical electrothermic methods as well as a review of the nature and clinical possibilities of short waves and inductothermy.

From what has been said above the work as a whole should certainly appeal to all who unquestioningly seek that type of information labeled as "tried and true." On the other hand the progressive minority in our midst will no doubt find sufficient justification to voice its objection to a text that avoided its responsibility to present a more detailed and vigorous exposition on the most fascinating and newest chapter of short wave therapy. Such a presentation would have been in keeping with the contributions of other foreign sources, sources regarded as authoritative and conservative for their scientific views. Impelled perhaps by a conservatism reminiscent of Pope's advice not to be "the first by whom the new is tried, nor yet the last to lay the old aside," Cumberbatch has valiantly labored in the old and new problems in this highly provocative terrain of therapeutics and has con-

firmed certain valuable opinions which are now neither too new or too old. He has left much to be said on short wave therapy that others will perforce say, because he has here assumed the attitude of commentator, rather than leader. This is to be regretted because the work should have reflected the richest experience of an original thinker and pioneer in physical medicine.

KURZWELLENTHERAPIE IN DER PRAXIS (Short Wave Therapy In Practice). *Von Dr. Ernst Raab*, Berlin; with a Foreword by *Professor Dr. Erwin Schliephake*. Paper. Pp. 173 with 97 illustrations. Price, M.5.80 and 6.80. Leipzig: George Thieme, 1937.

This work will undoubtedly appeal to all serious students of short wave therapy as a conservative and critical contribution based on wide clinical experience. The foreword by Professor Schliephake is warm in his appreciation of the author's personal labors as a pioneer in this field and shows tolerance for views that have not always corresponded with those earlier enunciated by himself. In principle they are in agreement as to the general effects of short wave radiation, but differ only in the detail of its technical and methodic interpretation. Raab voices the opinion that the future of short wave therapy lies in the hands of those who have and will continue to advance its practice on the basis of objective facts, rather than on theories that may have had value by implication instead of demonstration. The text is divided into six large sections, excluding a comprehensive bibliography and a detailed index. The exposition ranges from description and analysis of the important physical principles of short wave transmission and its application and action on biologic and human living material. It incorporates detailed discussions on the problems of dosage and therapeutic indications; it reviews the present status of electroprexia and its induction, effect and indication, and closes with a brief and impressive summary of the present trend of short wave therapy in modern medicine. Lest we may interpret the author's trenchant style as antagonistic to generally accepted views, it should be stated that in the majority of instances his criticisms are justified and his opinions accepted as both practical and constructive. Raab has extended our knowledge of the working nature of tube and spark gap instruments; of the comparative heating value of spaced electrodes; of the limitation of possibilities of coil fields as compared to condenser fields; of the importance of variable dosage in acute, sub-acute and chronic diseases. It is pointed out that short waves are not a panacea for all ills, and it is explained that the best results can only be obtained where there is understanding of both the pathologic background and the physiologic reactions to be in-

voked by a procedure that is too variable in its action unless intelligently administered. From what has been said it is clear that this work merits a wider reading public which could best be facilitated by its early translation into the English language.

---

**A METHOD OF ANATOMY.** By *J. C. Boileau*, M.C., M.B., Ch.B., F.R.C.S. (Edin.), Professor of Anatomy in the University of Toronto. Cloth. Pp. 627 with 564 illustrations. Price \$6.00. Baltimore: William Wood and Company, 1937.

The study of anatomy involves the most intensive of memory work and has always been the bugbear of medical students. Because of the necessity of obtaining a full knowledge of the subject, the novice has had to resort to the laborious method of extra laboratory study and review, which entailed the loss of precious time in poring through numerous texts. Such handicaps have served only to stress the multiplicity of anatomical detail without achieving the all important end, the fixation of a mental picture of the subject matter—one by which all of the facts could be correlated and digested in the most comprehensive manner. It was this objective of recreating and emphasizing anatomic relationships that makes this publication of special value to the student, and it is to the author's credit that the achievement of this ideal has been attained in such a clear and comprehensive manner. This anatomic method of study with its special didactic approach, containing as it does the numerous interesting and practical applications of anatomy should therefore prove a valuable asset to the student in molding a firm understanding in this most fundamental of subjects. As such this work can be regarded as a valuable supplement to the laboratory atlas and the more detailed texts because of its ability to reduce the burdensome memory efforts entailed in this study.

---

**SOME QUANTITATIVE ASPECTS OF THE BIOLOGICAL ACTION OF X- AND GAMMA RAYS.** By *C. M. Scott*, Department of Materia Medica, University of Edinburgh. Paper. Pp. 99. Price 1s. 6d. net. London: Medical Research Council, National Institute for Medical Research, Hampstead, 1937.

Appreciation of the clinical usefulness of x-ray and radium therapy has today become so widely manifest that it has become an accepted by-word in the practice of modern medicine. Their increasing use by the profession has of necessity encouraged empirical methods for the treatment of benign and malignant lesions, which now requires scientific proof for a complete understanding of its fundamental action. This report endeavors to fill this obvious gap by reviewing the quantitative biological action of x- and gamma rays in the most critical and concise manner. That the subject matter is divested of speculations is indicated by the very first sentence of this work; namely, that "the general purpose of this report is to throw light on the possible nature of the lethal action of x- and gamma

rays on living cells." Scott points out the difficulties encountered in such an undertaking—difficulties associated with determination of exact dosage for normal and malignant tissues and the proper method of its evaluation. It is pointed out that in living cells one encounters a remarkable variation of sensitivity or susceptibility toward radiation. The irradiation required to kill the adult fruit fly (*Drosophila*) is several thousand times higher than that necessary to destroy its eggs. This and similar examples indicate that the dosage factor plays a tremendous role in the therapeutic action of these rays in pathologic and normal tissues, and that its fundamental action is perhaps related to an influence on the very nucleus of the cell. That Scott favors such a theory is indicated in this text, but no matter whether one is attracted or repelled by this point of view, the facts herein presented are so conservatively and critically reviewed as to provide the reader with a scientific and thought provoking evaluation of the problems concerning the fundamental biologic action of x- and gamma rays in medical practice. The appended bibliography offers a rich source of added information. Its sponsorship by the Medical Research Council is an assurance of its scientific value and conservative point of view.

---

**ALLERGY. ITS PRACTICAL APPLICATION** By *J. A. Rudolph*, M.D., Associate Clinician in Charge to the Department of Allergy, Mt. Sinai Hospital; Consultant in Allergy, Cleveland Y. M. C. A. Cloth. Pp. 224. Price \$3.00. Philadelphia: Dorrance and Company, 1937.

The subject of allergy has become increasingly important not only to the allergist but to other specialists in medicine and surgery. It is no wonder then that numerous new books and treatises dealing with all allergic subjects of various description have come from the press in recent years. In the present volume we have a brief yet comprehensive compilation of well-known allergic symptom complexes. This manual has been written chiefly from the author's experience with a large practice limited to allergy. The author adds, however, that the literature was constantly referred to for accuracy of technical and historical facts. In this respect the author has been successful. For quick reference or for a brief review of the subject one should find Rudolph's work of considerable benefit.

---

**HOW TO SLEEP AND REST BETTER.** By *Donald A. Laird*, Sc.D., Ph.D., Professor of Psychology, Colgate University, Riversrest Psychological Laboratory, Hamilton, N. Y. Cloth. Pp. 83. Price, \$0.35. New York: Funk & Wagnalls Company, 1937.

Rest is one of the most useful physical principles used in treatment. This volume discusses this subject in detail. It is a book that should be read by everyone because the right kind of sleep is so indispensable to the human being, both in health and disease. Written by an eminent authority in a style devoid of technical expressions, this small brochure

should appeal to all readers interested in the restorative qualities of restful sleep because it has undertaken to explain the "how" of a problem that has long been regarded as one of the vital restorative procedures within the domain of therapy.

**THE CEREBROSPINAL FLUID.** By *H. Houston Merritt, M.D.*, and *Frank Fremont-Smith, M.D.* With a foreword by *James B. Ayer, M.D.* Cloth. Pp. 333. Price, \$5.00. Philadelphia and London: W. B. Saunders Company, 1937.

This book is a valuable addition to the extensive literature on cerebrospinal fluid and helps to further clarify the importance of this problem in relation to medical practice. One is duly impressed with the fact that the authors have largely drawn on personal experience for their evaluation of the cerebrospinal fluid changes encountered in various diseases. They are thus able to advance authoritative opinions and statistical data regarding the reactions and changes to be expected in the cerebrospinal fluid under different diseased states. Though the subject matter is well arranged, the exposition often stresses or minimizes certain discussions which may be considered of equal or of opposite importance to readers of critical habits. For instance, the authors devote a great deal of space to chlorides in cerebrospinal fluid, giving a good number of tables and graphs, while other subjects equally important do not receive as much attention. This may be explained on the ground that Merritt and Fremont-Smith have done a great deal of work of permanent value on the subject of chlorides and it is natural that this subject should receive wider and preferred attention by them. Since the work limits itself to the ordinary clinical examination and hardly any mention is made of some of the other investigations that have been made in the last few years on the subject, it is suggested that future editions correct this omission. While the authors may not regard these investigations as of sufficient importance they should have, at least, mentioned them and given their opinion in the matter. One such subject to which one finds no reference is the tryptophan test, which is still used by a good many clinicians. Another one is the colloidal benzoin reaction. The authors at times also give credit for investigations to people who have published papers in the last few years when actually the original one was presented many years prior to the one quoted. As a whole, the book is a scholarly contribution and well worth its reading.

**CUNNINGHAM'S TEXT-BOOK OF ANATOMY.** Edited by *J. C. Brash, M.A., M.D., F.R.C.S.*, Ed. Professor of Anatomy, University of Edinburgh, and *E. B. Jamieson, M.D.*, Lecturer on Anatomy, University of Edinburgh. Including 10 Special Contributors Listed in the Text. Seventh Edition. Cloth. Pp. 1506 with 2021 illustrations. Price, 42s. New York: Oxford University Press, 1937.

In the study of anatomy the text of Cunningham has always been regarded as authoritative and com-

plete in every branch of the subject. The seventh edition is no exception to this rule, for it maintains its leadership as an exceptional treatise on anatomy. As no great period of time has elapsed since the issuance of the sixth edition, it is to be expected that no radical change would be called for in any particular section of this work. Consequently we find that the new edition is not essentially different from the previous "Cunningham text," but has only undergone a careful revision, and where required, has been brought into harmony with modern views and methods in the teaching of anatomy. The illustrations, for example, are one of the many new contributions that offer increasing refinement to the description. Illustrations have been partly replaced by and supplemented with new ones, and a series of radiographs (negative reproduction) have been included to demonstrate the structure and growth of the skeleton and the position and form of the various organs of the living body. A group of plates with photographs of the living body have also been introduced to show the effects of the muscles in action. These improvements and many other practical revisions are to be credited to Brash and Jamieson, who have in this edition ably taken over the editorship of this classical treatise written by the late Professor Cunningham and edited in the last twenty-five years by Professor Arthur Robinson. The scholarly tradition that has been associated with this text is well supported by the new editors, and its timely modernization is a feature as progressive from a teaching standpoint as is to be encountered in modern textbooks on subjects of anatomy.

**SYMPTOMS AND SIGNS IN CLINICAL MEDICINE. AN INTRODUCTION TO MEDICAL DIAGNOSIS.** By *E. Noble Chamberlain, M.D., M.Sc., M.R.C.P.*, Lecturer in Medicine, University of Liverpool, etc., with a Chapter on the Examination of Sick Children by *Norman B. Capon, M.D., F.R.C.P.*, Lecturer in Diseases of Children, University of Liverpool. Cloth. Pp. 424 with 295 illustrations. Price, \$8.00. Baltimore: William Wood & Company, 1936.

When the neophyte in medicine is confronted with the problem of writing down his observations for the purpose of determining the nature of disease, his success is largely controlled by the facility of his trained senses and the aid of the laboratory findings to bring into clear relief the obvious and occult symptoms that group themselves under special terms. The voluminous information on the subject clearly indicates that special training and wide experience is the only desideration for a thorough mastery of the subject, unless handy assistance can be obtained by reference texts that appreciate the difficulties confronting the student at the bedside and provide concise information and simple guidance. This has been recognized by Chamberlain and been the objective of this contribution. He has introduced within the space of a single volume those essential and pertinent facts regarding the physical signs and symptoms encountered in routine hospital and private practice which could be readily utilized by the recent graduate of medicine, and no less by the general practitioner long out of touch with the

didactics of medical instruction. The text provides a detailed exposition of every system of the body, describing by photographs and diagrams the method of routine interrogation and examination of the objective and subjective phenomena that may be encountered by all of the trained senses in both adults and children. Worthy of mention because of its special diagnostic value are the three chapters dealing with fever and its signs and symptoms; the information through instrumental investigations by paracentesis, injections of chemicals, and the like; and confirmation through laboratory examinations of pathologic and biochemical material. While this work cannot by any stretch of imagination be considered as a primer on physical diagnosis, it could well be regarded as one of the clearest expositions on the art of medical diagnosis published to date.

---

**BRIGHT'S DISEASE AND ARTERIAL HYPERTENSION.** By *William J. Stone, B.Sc., M.D., F.A.C.P.*, Clinical Professor of Medicine, School of Medicine, University of Southern California, Los Angeles; Attending Physician to the Pasadena Hospital, Pasadena, California. Cloth. Pp. 352 with 32 illustrations. Price \$5.00. Philadelphia: W. B. Saunders Company, 1936.

This volume contains a concise discussion of the many factors and problems related to the study and treatment of Bright's disease and changes in arterial tension. It attempts to formulate the most advanced information on the classification of renal disease; the physiology of kidney function; the water balance in the body; and the biochemical changes associated with edema, acidosis and alkalosis. By implication as well as by direct illustration one is impressed that treatment of the various forms of Bright's disease is often interwoven with physical procedures of long proven value. In the management of acute hemorrhagic Bright's disease with convulsive seizures, hot baths or packs are recommended because of their diaphoretic and eliminative properties. Stone also points out that diathermy through the kidney region may be followed with beneficial results. In the chronic form the author cautions that many patients are more harmed than benefited from the continued use of measures that tend to induce profuse sweating. On the other hand

diathermy or hot packs applied to the kidney region may provoke diuresis. The pleasing format of the text and the clear illustrations indicate the serious cooperation of an experienced publisher. From what has been said it is clear that this volume can be recommended to physicians as containing the latest views on the pathology, the biological chemistry, the clinical problems of Bright's disease and arterial hypertension and their treatment.

---

**DIETETICS FOR THE CLINICIAN.** By *Milton Arlenden Bridges, B.S., M.D., F.A.C.P.* Director of Medicine, Detention, Rikers Island and West Side Hospitals, New York; Consulting Physician, Seaview Hospital, Staten Island, New York and Department of Education, New York University, New York; Assistant Professor of Clinical Medicine and Lecturer in Therapeutics and Nutrition, New York Post-Graduate Medical School of Columbia University; Associate Attending Physician and Chief Diagnostic Clinic, Post-Graduate Hospital, New York; Fellow of New York Academy of Medicine. Cloth. Price, \$10.00. Pp. 1055. Third Edition, Philadelphia, Lea & Febiger, 1937.

This is the third edition of a successful work on the feeding of the sick. The author offers a new classification of foods, presenting their mineral, nutritive and vitamin values in their edible state, as well as the analyses of raw products. This edition includes the dietary treatment of more than two hundred diseases, many of the chapters being written by specialists in their respective fields. The section on vitamins has been revised in accordance with the latest information. Over three hundred diets are given and nine hundred menus are presented in the form of three meals daily for at least three days. Each disease is introduced by a brief discussion of the physiologic and pathologic needs presented by the patient. The work provides a detailed listing of those foods to be omitted from the diet; a listing of those foods which may be taken in limited quantities; a presentation of a series of practical edible items of food, readily obtainable, arranged in accordance with the latest principles of diet therapy; and whenever indicated there are added a number of practical medical and culinary suggestions. This volume can be recommended as an excellent text-book on dietetics.



# INTERNATIONAL ABSTRACTS

**Determination of Ultraviolet Light Absorption by Certain Bacteriophages. Leslie A. Sandholzer; Marvin M. Mann, and George Packer Berry.**

Science 86:104 (July 30) 1937.

The absorption of ultraviolet light by three bacteriophages C13, C16 and C36, prepared with a strain of *Escherichia communior* has been determined. Each bacteriophage preparation showed a characteristic absorption curve, when the wavelength was plotted against the photographic density. Crude bacteriophage preparations absorbed more light than one such preparation obtained in a purer state, but the wavelength of maximum absorption remained the same.

**An Evaluation of Artificial Hyperpyrexia in Tuberculosis. G. R. Duncan and E. S. Mariette.**

Am. Rev. Tuberc. 36:387 (Sept.) 1937.

After three years of experience in the treatment of pulmonary tuberculosis by hyperpyrexia induced by means of baths, general diathermy or the Simpson-Kettering Hypertherm, it became apparent that the change in the chest as seen in the x-ray film occurred immediately or shortly after the completion of treatments. The only late effect that one could be sure of is the adverse effect of exhaustion produced by overtreatment. When this occurred the patient did not respond well. It was observed that the patients on a regime of exercise tolerated hyperpyrexia better than bed patients. Most of the patients treated by baths and general diathermy were of the former group. They tolerated the treatments better than the group of recently admitted patients who were still in bed and who were treated by the Simpson-Kettering Hypertherm. But neither group was benefited greatly from this type of treatment.

When this temperature was continuous for three weeks human tubercle bacilli failed to grow.

To be of any value in the treatment of tuberculosis, artificial hyperpyrexia should result in an increase in pulmonary temperature over a fairly long proportion of each day without strain to the patient.

**Effect of Heat and Ultraviolet Radiation Iso-Agglutinins in Dried Blood Stains. A. I. Kayssi and Gilbert Millar.**

Br. M. J. 2:114 (July 17) 1937.

The object of this study was to determine to what extent adverse conditions would affect the grouping of bloods by means of dried stains kept in circumstances similar to those likely to be met with in ordinary medico-legal practice. For this

Kayssi and Millar investigated the iso-agglutinins, which are more labile than the agglutinogens by exposing the stains to dry heat and to ultraviolet radiation — these being factors likely to occur in practice, particularly in the tropics — the influence of which on the stain might be important. In agreement with generally accepted views no difficulty was experienced in accurately diagnosing the group of a blood by the agglutinins present in a dried stain. Moreover, no difficulty was encountered after exposing the stains to dry heat at 64 degrees C. Dry heat at 100 degrees C. diminished the strength of the agglutinin factor to a considerable extent, but did not usually abolish it completely. This temperature apparently had some influence on the appearance of regular rouleau formation. Ultraviolet radiation under the above described conditions produced no obvious effect on the agglutinins. On the other hand, it did appear to have a certain influence in diminishing the formation of regular rouleaux. It seemed unlikely that ordinary blood stains would lose much of their agglutinin content if kept dry, even if they were exposed to strong enough sunlight and fairly high temperatures.

**Further Studies With Zinc Ionization in the Treatment of Trachoma. Samuel M. Edison.**

Illinois M. J., 71:431 (May) 1937.

Butyn anesthesia is used. With the patient in the recumbent position, the negative pole is connected to a pad (saturated with normal salt solution) affixed by a wet pad to the patient's arm or back. The positive pole is connected to the eye electrode, previously saturated with a 2 per cent zinc sulphate solution, and inserted under the lids. A current of about 5 to 7 ma., from a galvanic apparatus, capable of delivering at least 10 ma., is turned on gradually for ten minutes. After removal of the eye-electrodes, the fornices are thoroughly irrigated with saline solution, as there is a considerable amount of zinc chloride solution mixed with the lachrymal fluid, which is quite irritating.

Edison points out that all cases had previously resisted many forms of accepted treatment for a year or longer, and zinc ionization resulted in arrest of the disease after one or more treatments, excepting in 7 per cent of the cases which did not respond. No complications or sequelae resulted in any of the patients treated, and only edema of the lids and engorgement of the conjunctivae were noticeable. Follicles disappeared rapidly and cicatrices when present became thinner and smoother in most cases. Thickening of the lids and ptosis were noticeably reduced in all cases. The favorable results were noticed early,



even after one zinc ionization treatment. Improvement in vision was noticed from 1/10 to 3/10 in 21 per cent of the cases treated. Total percentage discharged as arrested in both series was about 41 per cent. Cases which resisted routine treatment for a year or longer, who received one zinc ionization treatment and who refused further ionization, and who were subsequently treated routinely, were discharged in ten weeks as arrested without any further active treatment and remained quiescent. Amelioration of all subjective symptoms with notable beginning regression of follicles was obtained in 24 per cent of all cases treated after only one treatment. Zinc ionization was employed in acute and chronic cases of trachoma and in the presence of corneal ulcers and pannus. No expensive equipment or apparatus is required. Any galvanic current generated by dry or wet cells, a battery or street current fitted with a rheostat and milliamperemeter is suitable.

---

**Elevation of Rectal Temperature Following Mechanical Obstruction to the Peripheral Circulation. J. Murray Steele.**

Am. Heart J. 13:542 (May) 1937.

A method of obtaining continuous records of temperature is described in which the movements of beams of light reflected from the mirrors of galvanometers connected to thermocouples are photographed. Relatively mild obstruction to the circulation of the extremities obtained by use of pressure cuffs about the arms and legs is followed promptly by rise in rectal temperature. In a warm environment, the rise of rectal temperature tends to be greater and the fall of surface temperature less than in a cool environment. The results suggest that the relatively mild and short obstruction to peripheral circulation used in these observations brings about elevation of rectal temperature and is consistent with the belief that elevation of rectal temperature encountered in the course of heart failure may be due simply to slowing of the peripheral circulation.

---

**Hydrotherapy in Mental Diseases. Rebekah Wright.**

M. Rec. 145:463 (June 2) 1937.

Hydrotherapy is not a cure for any form of mental illness. Some of the mental conditions that may be partly or wholly relieved by hydrotherapy are extreme motor activity, delirium, agitation, insomnia, cerebral congestion, arterial hypertension, vasomotor paresis, gastric disturbances, intestinal disorders, suppression, retention or incontinence of urine, visceral congestion, pain, autointoxication, faulty metabolism and inanition. Like our most potent drugs, hydrotherapy is a "two-edged sword." Much depends upon the intelligence, training, tact, kindness, firmness and fidelity of the nurse who administers the treatment. Satisfactory therapeutic effects of the available hydropathic measures depend largely upon the prescribing physician's knowledge of the

physiological effects of heat, cold, contrasting temperatures, pressure and friction.

The hydrotherapeutic department of the hospital contains equipment for giving sedative, eliminative, and tonic procedures. Rooms for continuous baths, wet sheet packs and colonic irrigation are provided in the sedation suite. Facilities for mild sedation, for local and general anodynes, for elimination through the skin, and for stimulating and tonic effects are provided in the tonic bath suite. The major sedatives in general use are the continuous or prolonged neutral bath and the wet sheet pack.

---

**Physical Medicine in the Treatment of Gastrointestinal Conditions. Herman A. Osgood.**

M. Rec. 145:460 (June 2) 1937.

Local applications of heat is one of the most effective means of counteracting gallbladder pain. That many cases of chronic cholecystitis are benefited by diathermy as an adjuvant can be demonstrated by the improved function observed in comparative Graham tests before and after the treatment series. The symptomatic relief experienced should be sufficient indication for its use. Obviously, the anatomical position of the gallbladder, as well as the pathological changes must first be determined by x-ray and clinical study. Little benefit can be expected from applying the diathermy plates under the right costal margin if the gallbladder lies well down in the right lower quadrant and well over towards the median line. Infrared and diathermy has been recommended for postoperative gallbladder adhesions and associated periduodenitis, and in cases of temporary obstruction where symptoms may be due to spasm. Physical therapy combined with non-surgical duodenal drainage offers possibilities in the treatment of chronic liver and gallbladder conditions which are not yet fully evaluated and deserve further study.

---

**The Prevention of Disability in Poliomyelitis. H. L. Greene,**

Wisconsin M. J. 36:903 (Nov.) 1937.

After all muscle tenderness has subsided, a program of re-educational exercises must be instituted, which will not produce pain or fatigue. Warm baths in a bath tub are extremely beneficial and gratifying to the patient. Gentle movements under the water at a temperature of 95 to 98 degrees F., warm the involved muscles. The buoyancy of the water counteracts gravity to the extent that danger of over fatigue is lessened. As muscles lose their tenderness, the patient may be turned on his abdomen with the toes hanging over the edge of the mattress. This position is effective in counteracting a tendency to hip flexion deformity and scoliosis and relieves a tendency to foot drop.

It is during the convalescent period that training should be started to strengthen weakened muscles. Muscle training should be preceded by baking and mild massage to increase circulation of the part. An effective method of carrying

out muscle re-education by a trained nurse or by the mother in the home has been devised by the late Dr. Gaenslen. This method is of tremendous value in the absence of hydrotherapy. Briefly, the method consists of supporting the arm or leg to be treated in a sling from overhead, thus eliminating the weight of the extremity during movement. It is adaptable to either the upper or lower extremity and easily taught to the nurse or mother in the home. Such sling suspension exercises readily reveal minimal muscle power and a slight gain in power is easily recognized.

To sum up the convalescent stage, it may be stated that the sensitive stage is over. The paralyzed muscles make their greatest gain during this stage, and active muscle training should be faithfully carried out. The chief objectives are:

1. Making a complete muscle chart to show the extent of the paralysis and comparative strength of the muscles.
2. Watching for and preventing deformity.
3. Stimulating circulation and increasing nutrition.
4. Promoting relaxation and rest.
5. Protecting muscles from overstretching.
6. Preventing contracture.
7. Re-educating and strengthening muscles by suitable exercise.

**The Treatment of Hay Fever, Vasomotor Rhinitis and Allergic Cases With Zinc Ionization (Second Report). Philip L. Romonek.**

Nebraska M. J. 22:387 (Oct.) 1937.

Zinc iontophoresis has given complete relief to 48 out of 56 patients with hay fever, allergy, hyperaesthetic and vasomotor rhinitis.

Following the technic of Warwick, complete relief was obtained in 23 out of 25 cases of hay fever, with and without asthma. Clinical observation of the nasal mucosa has thus far shown no evidence of permanent nasal damage. According to Romonek, this is the most successful hay fever treatment that has been presented thus far.

**Ultraviolet Irradiation: Clinical Applications. A. P. Cawadias.**

Brit. J. Phys. Med. 12:70 (Aug.) 1937.

**Prevention and Treatment of Colds:** Many children and adults are liable to frequent colds, and this is a real misery during the winter months. The liability is due to a special predisposition, a special diathesis. Recent efforts have been made to immunize the patient against colds by improving the general constitution so as to render the patient more resistant to various external pathological factors. One of the elements of this improvement is removal of certain local factors of the upper respiratory tract which render the individual prone to infections of this area. The next step is an all-around improvement of the body and general hygiene of the patient, and here ultraviolet irradiation plays a very important role. It cannot be doubted that in-

dividuals, particularly children, subjected to ultraviolet irradiation experience a diminished tendency to colds. Not all children, of course, but some, and probably those on whom ultraviolet acts are those possessing the metabolic disturbances of calcium which ultraviolet corrects.

Technic in such cases is that of suberythematous doses. For children the mercury vapor seems superior, for adults the carbon or tungsten arc. This point has lately aroused much discussion, which has no meaning for the physician who thinks constitutionally. In the first place the failure of strong doses shown in statistics is not astonishing. According to our knowledge of the biology of the action of ultraviolet rays strong erythematous doses not only fail to raise resistance to colds but rather depress it.

**On Treatment of Lobar Pneumonia. Sir Arthur J. Hall.**

The Practitioner, 136:1 (Jan.) 1936.

It has for long been recognized clinically that a strong febrile reaction is a good sign in pneumonia. Whether the benefit actually arises from the raised temperature itself, or from the causes which give rise to the pyrexia is unknown. Cultures of the pneumococcus flourish best in vitro at normal body temperature, whereas at about 102 degrees or over they do not grow so well, and at 107 degrees they die. Though conditions in the tissues are very different from those in vitro yet the laboratory findings so far as they go, support clinical observation by suggesting that a high temperature hampers the invader.

While not for a moment advocating that the methods in use for the treatment of general paralysis of the insane should be adopted in cases of pneumonia, yet a consideration of the above points should at least make us pause before condemning the method fashionable fifty years ago of keeping pneumonia very warm. There is now available a purely physical apparatus, capable of arising the body temperature through four or five degrees in a very short time—one or two hours—and this without the least exertion on the part of the patient or the slightest discomfort. A trial of this in a case of pneumonia in which the pyrexia response is poor might be instructive: it is difficult to see how it could do any harm.

**Gonococcal Endocarditis Treated With Artificial Fever (Kettering Hypertherm). Robert H. Williams.**

Ann. Int. Med. 10:1766 (June) 1937.

Within the last 15 years numerous authors have reported case studies of gonococcal endocarditis. A uniform feature of the reports has been the expression of a gloomy attitude regarding the efficacy of any form of treatment, once the organism has become established on a heart valve. The present communication is concerned with the results obtained by treating one

case of verified and one of probable gonococcal endocarditis with artificial fever (Kettering hypertherm). The report describes a history of proved and one of probable gonococcal endocarditis treated in the Kettering hypertherm are recorded. In the proved case, fever treatment resulted in sterilization of the blood and, as established at necropsy, sterilization and healing of the endocardial vegetations. Death was due to co-existing syphilitic cirrhosis of the liver and uremia. At autopsy no pathologic changes were noted in viscera which could be attributed to the effect of fever treatment per se. In the case designated as probable gonococcal endocarditis with co-existing acute gonococcal arthritis, fever treatment resulted in prompt recovery.

#### **Sensibilization of Skin for Ultraviolet. Fr Bering.**

Strahlentherapie 60:16 (Sept.) 1937.

The sensitivity of the skin is increased in cases of acute eczema — not only against ultraviolet but against sunlight, too. Small affections in one place are sufficient to produce a hypersensitiveness of the whole body. Hypersensitivity was produced by urticaria, lichen ruber, Quincke's edema, dermatitis herpetiformis and Werlhof's disease. Psoriasis gave different reactions, the same being true for syphilis, depending on the time after infection. Acid diet acted as a sensitivity increasing factor, the contrary being the case for alkaline and NaCl-free diet. These findings are of greatest importance for the treatment of lupus. The sensitivity for ultraviolet was increased by administration of atebriu and salvarsan, it was decreased by prontosil, torantil and quinine.

#### **Thermal Interchanges Between Human Body and Its Atmospheric Environment. A. P. Gagge; L. P. Herrington, and C. E. A. Winslow.**

Am. J. Hyg. 26:84 (July) 1937.

As a result of extensive studies of unclothed subjects in a semi-reclining position, the authors have described the general nature of the thermal interchanges between the human body and its varying environment. Under relatively cool conditions skin temperature decreases and the tissues of the body become chilled (positive storage in our terminology). The authors have indicated by diagrams how combinations of air and wall temperature will produce equivalent effects on skin temperature and storage. In a relatively warm environment, the temperature of the body is maintained approximately constant by changes in sweat secretion to balance the heat received from the environment. This reaction is measured by a factor for "wetted area" of the body surface and may be predicted from the environmental temperature and relative humidity. Also analyzed was the influence of air movement in both the zone of body cooling and the zone of evaporative regulation.

#### **Treatment of Hay Fever by Intranasal Zinc Ionization. Preliminary Report of 243 Cases. Lionel D. Bailey, and Clive Shields.**

Brit. M. J. 3980:808 (April 17) 1937.

In 1936 the St. George's Hospital treated 243 patients with the diagnosis of vasomotor rhinorrhoea by intranasal zinc ionization. These were of both sexes, and the ages ranged from 5 to 77 years. A special analysis of 100 cases showed that 88 per cent were of the seasonal type; 12 per cent were of the non-seasonal variety and presented symptoms of varying severity throughout the twelve months. In only one case of seasonal vasomotor rhinorrhoea was there failure to give a considerable measure of relief; the only complete failures met with were in non-seasonal cases of long standing. No other treatment for the condition was given except that in a few cases where the secondary reaction was more marked than usual ephedrine,  $\frac{1}{2}$  grain, and "sedobrol," 2 tablets were ordered that night. No sprays, douches or local applications were prescribed, and the patient was asked to omit these if already in use.

#### **Are Ultraviolet and Sunlight-Irradiations Dangerous? G. Miescher.**

Strahlentherapie 60:134 (Sept.) 1937.

Experiments on mice, guinea pigs and human beings gave evidence that the tolerated dosage of ultraviolet rays may be increased greatly by gradually applying larger quantities of light. It is dangerous to start immediately and to continue for a long time with excessive quantities of these rays, thus preventing the skin from getting accustomed to the light. There is no doubt about the carcinogenic effect of light. These complications may be minimized by carefully controlling the time of exposure and by avoiding too strong reactions. From the experiments on animals we learn that parts normally exposed to light, such as the face, need special protection.

#### **Importance of Sensibilizing for Light Effects in Treatment With Natural and Artificial Light Sources. H. Jausion.**

Strahlentherapie 60:82 (Sept.) 1937.

The author emphasizes the importance of sensitization for light treatment if a sufficient quantity of ultraviolet is not available. As sensitizers for the shorter wavelengths he recommends Gonakrin (diaminoacridin - chloromethylate), diaminoacridin-methan-sulphonate and eosin, and for red and infra-red, methylen-blue and triphenylmethan violet (Hofmann-violet). These dyestuffs or mixtures of them may be given by mouth, by rectum, or intravenously. Indications of the "Photodynamotherapy" are shedding of the hair, alopecia, tuberculosis of the skin, surgical tuberculosis and some others. The lowering of the erythem-threshold after sensitization, measured with the Saidman-sensitometer, may be 5 to 6 points.